SEPT. 26 1958

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

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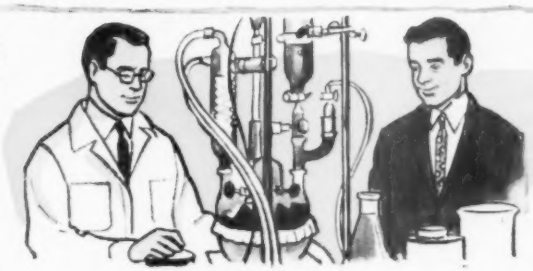

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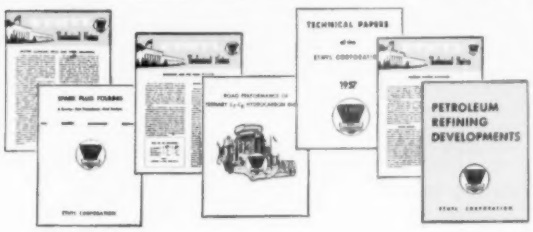

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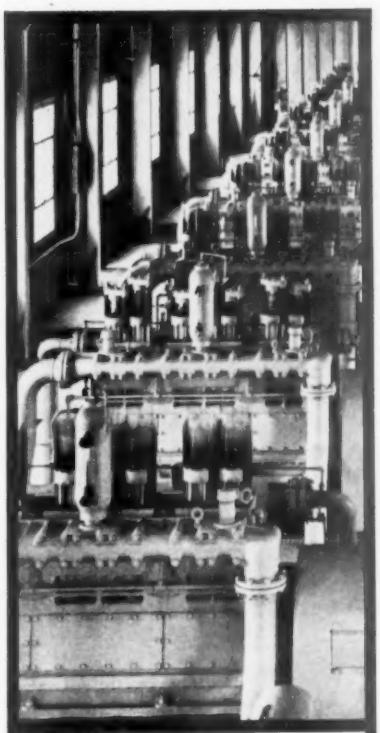

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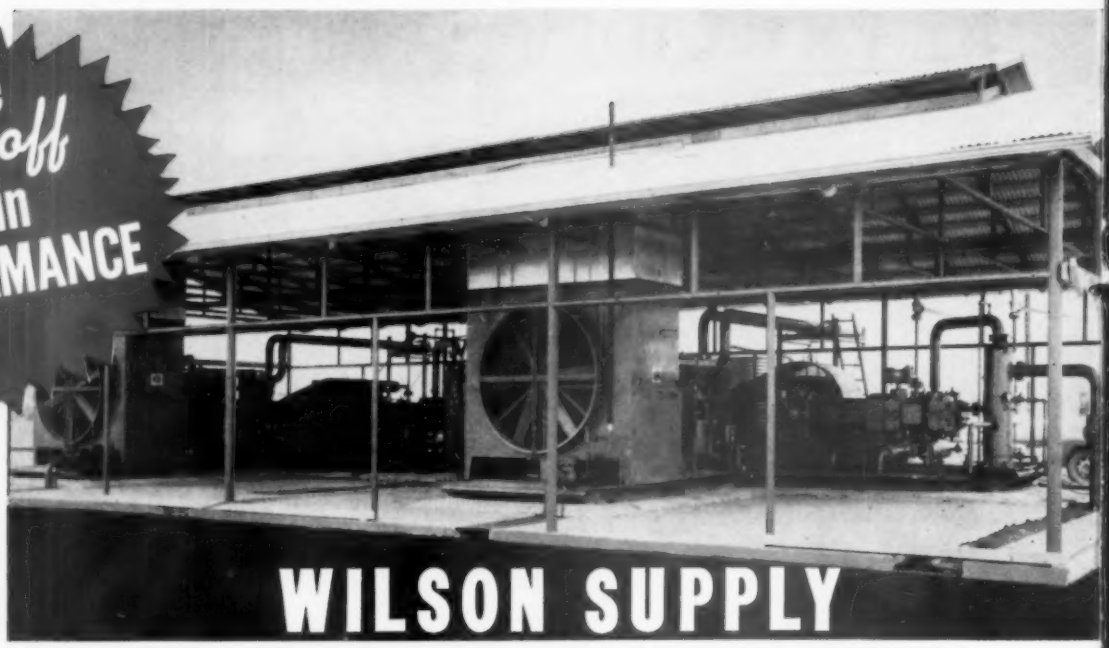

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60-Second Summary / WHAT'S HAPPENING IN OIL

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World politics may foul up efforts to harness atomic energy to work for oil. Many firms are keenly interested in the possible use of the A-bomb in shale and tar sand formations—and possibly to boost secondary recovery. But international negotiations may cause a big delay. . . . p. 13

•

Domestic demand in the fourth quarter will probably exceed earlier expectations. The Bureau of Mines, in a revised forecast, sees it running 4.9% higher in the next three months than in the same period of 1957. . . . p. 11

•

Russia is stepping up its efforts to cast Western oil firms in the role of villains. When an oil country has a crisis, Russia points an accusing propaganda finger at U.S. oil firms as the chief creators of trouble. . . . p. 21

•

The best bet for vibratory drilling seems to be in rocks of medium hardness. Research indicates that is where it appears to have the best chance of being economically competitive with rotary drilling. . . . p. 24

•

A gas-treating process has been developed to do three jobs at once: It (1) sweetens sulfur-containing gas, (2) dehydrates it, and (3) produces sulfur. . . . p. 38

•

Many U.S. oil firms are showing interest in French Africa. And the interest would be keener if there weren't so many uncertainties—including political. . . . p. 14

•

A pilot propane-injection project has paid for itself, both in current and ultimate recovery of oil. That's the conclusion of a new report on Sun Oil Co.'s use of the method in the Millican Reef field. . . . p. 22

•

Improvements in marine loading systems continue. For instance, Chiksan has come up with a longer "reach" for its loading arm, to service oil barges and tankers during all stages of tide. . . . p. 44

•

When substitute crudes arrive, refiners will be ready to process them. That appears to be the consensus of experts concerning gilsonite, coal, and other potential replacements for conventional crude. . . . p. 40

•

What are the principal causes of dealer turnover? An interim report on an API survey lists low volumes and lack of experience as the top two reasons. . . . p. 52

Up to the Minute / SIGNIFICANT LATE NEWS

AT-A-GLANCE PETROLEUM WEEK Copyright

September 26, 1958

Watch for a new Internal Revenue Service tax guide on equipment depreciation. A special IRS committee has been rewriting Bulletin "F," and will announce changes soon in the length of tax life of hundreds of items—ranging from machine tools to buildings. For some items, the depreciation period will be shortened, meaning bigger tax writeoffs.

•

House "influence" investigators are taking a look at the Federal Power Commission, particularly at FPC authorizations for gas pipeline construction. First witnesses scheduled at midweek were FPC Chairman Jerome Kuykendall and General Counsel Willard Gatchell.

There has been no indication by the committee that it thinks there is anything wrong at FPC. It just wants to find out.

•

As an anti-smog move, Los Angeles may limit the olefins in gasoline to 12%. The olefin content of gasolines now being sold in that area ranges up to 35%, a pollution control official there estimates. And he says that research has revealed that olefins are a leading air-contaminating hydrocarbon.

If the proposed limitation is submitted, as planned, to the Los Angeles County supervisors for consideration, a public hearing will be held.

•

David Proctor has been elected chairman of the board of Gulf Oil Corp., and Ralph O. Rhoades has been chosen to succeed him as executive vice-president. The board chairmanship has been vacant since 1957.

•

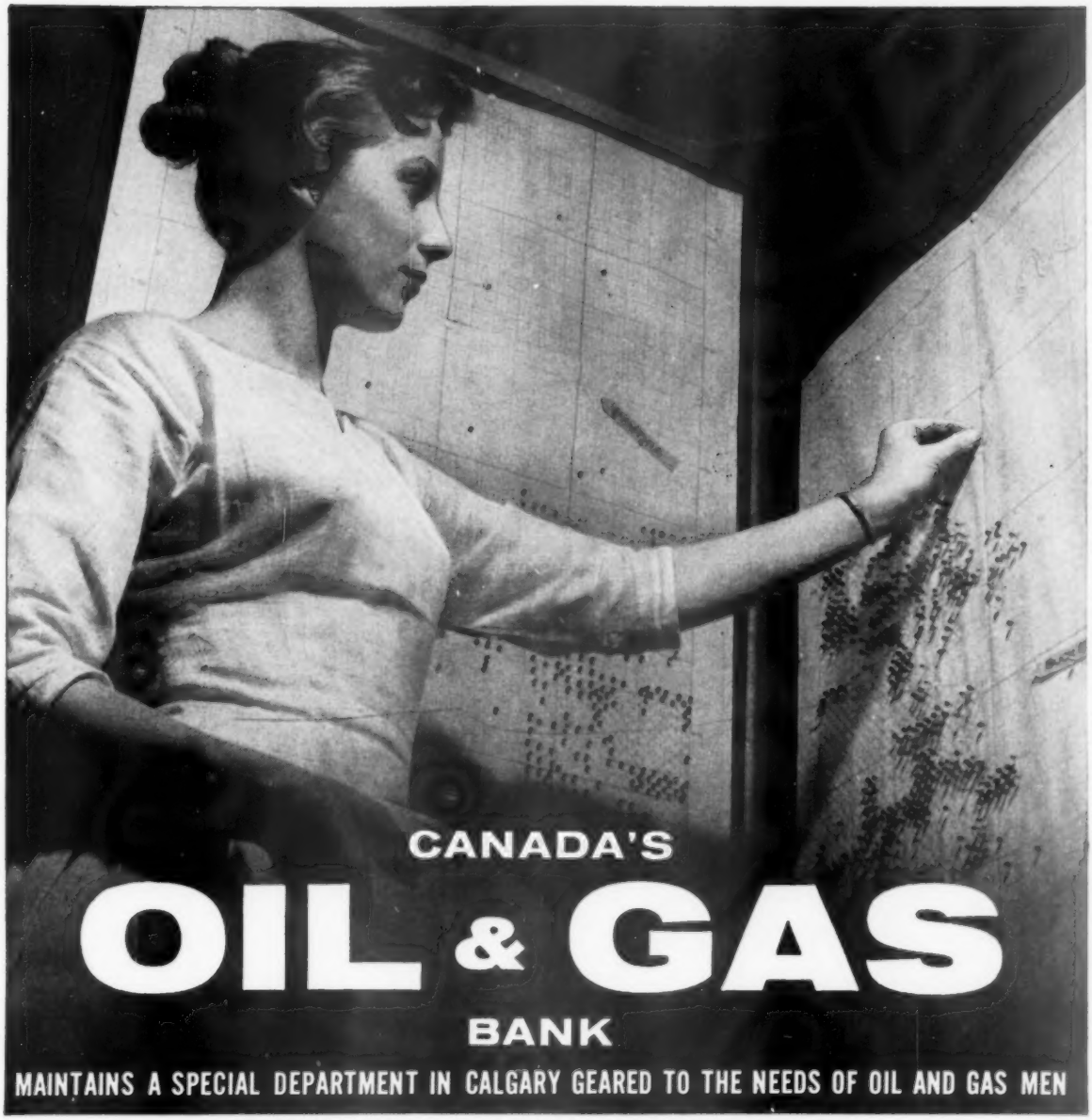
California state officials are unhappy over the U.S. suit aimed at halting land subsidence at Long Beach. They figure the state should be given time to work out its own program, saying they fail to see why repressuring under a federal court order would be any more effective than repressuring under state law. The U.S. got into the act because of subsidence damage at the U.S. naval shipyard at Long Beach.

•

An explosion has delayed processing tests at Texaco's new refinery at Anacortes, Wash. Ten workmen were injured by a blast in the burners of one of the vacuum heaters of a crude unit as the $55-million plant began to process its first crude on a test basis. The refinery is scheduled to go on stream about Nov. 1.

•

October allowables in Oklahoma and Louisiana will be almost the same as in September. The Oklahoma conservation director has recommended that the allowable be kept at 560,000 b/d in October. In Louisiana, the total allowable was increased 3,536 b/d to cover new production, but the depth bracket formula remains unchanged.



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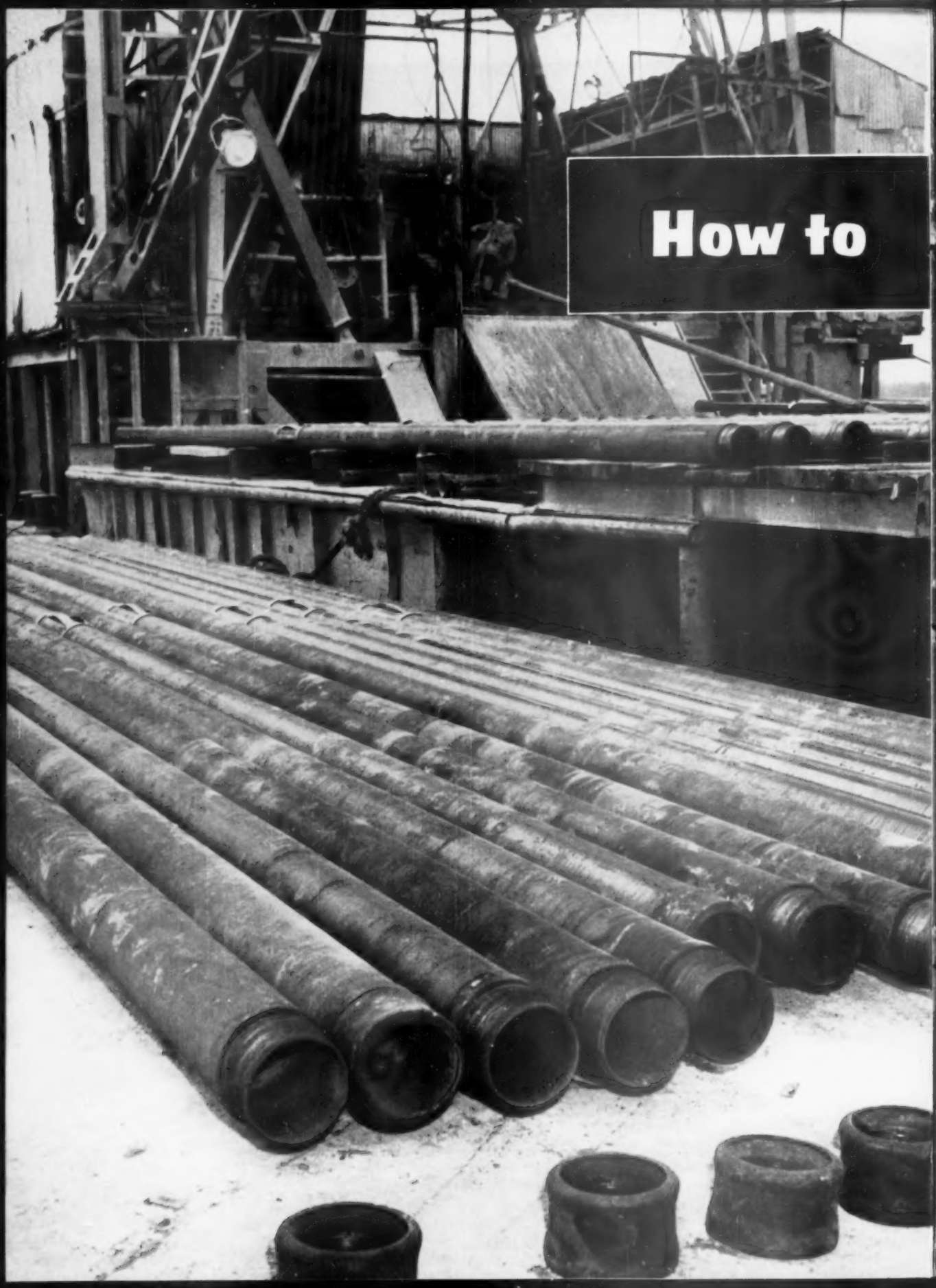
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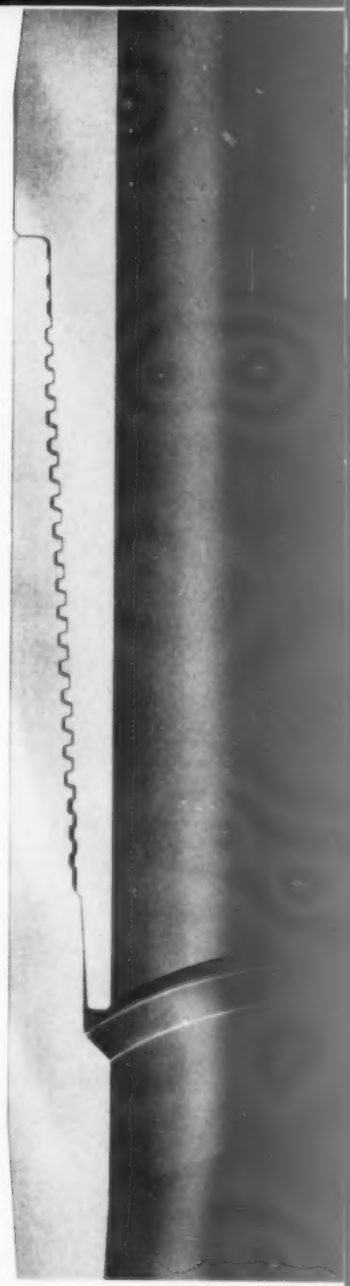
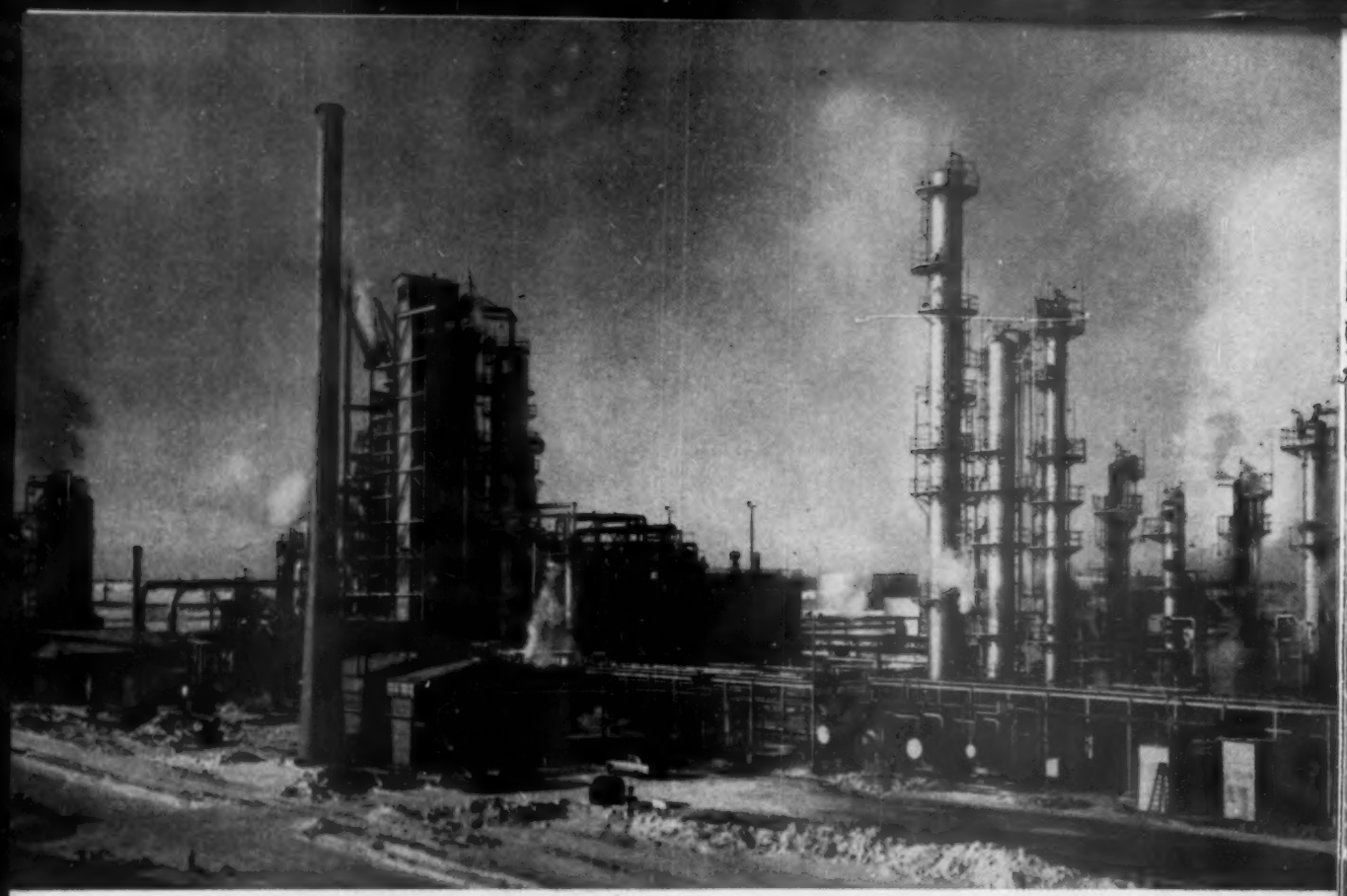


Extreme Line Joint



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OVERSEAS ENGINEERING AND CONSTRUCTION SERVICES

Domestic Demand Is Perking Up

U.S. oil consumption looks strong for the next three months, and new supply may be held at a tight rate.

The oil industry faces the start of the final quarter of the year with a little brighter outlook than had been expected earlier.

No big upturn is indicated. In fact the revised forecast of the Bureau of Mines, which was made last week (table), shows that total demand for the full year will run 100,000 b/d less than anticipated last January.

But a close analysis of the bureau's new estimate for the last three months of 1958, and of some of the other economic trends, is encouraging.

Domestic demand, which so far has been running just 1% over last year, is expected in the next three months to be 4.9% higher than in 1957.

The bureau predicts that domestic demand will average 9,595,000 b/d during October, November, and December, some 15,000 b/d higher than it had estimated earlier this year.

For the full year, domestic demand is expected to be 2.1% higher than in 1957. A sharp drop in exports, however, will hold total demand 1.2% under last year.

The new forecast places domestic demand for all of 1958 at an average of 8,999,000 b/d.

Last January, the bureau predicted that domestic demand for the year would run 9,024,000 b/d. But the general business recession brought a sharper-than-expected decline in use of residual fuel and a smaller-than-expected rise in gasoline demand.

For domestic demand, the second quarter of the year turned out to be the worst so far. Normally, demand in the April-June period is at the seasonal low for the year, but this year it ran 123,000 b/d below earlier estimates.

Export demand in the second quarter also was 84,000 b/d under the earlier expectation. And with the third quarter just about over, indications are that export demand in that period will be 90,000 b/d below the earlier estimates.

The over-all results: It is now anticipated that total demand for 1958 will average 9,269,000 b/d.

Compared with 1956, a more "normal" year for the oil industry, domestic demand this year will show a gain of 2.5%.

The estimated total demand for 1958 will represent a gain of 0.7% over 1956, with export demand declining 37.2%.

The most encouraging prospect for the industry in the last three months of the year is that the rate of new supply—and consequently refinery runs—may not be as high as expected.

The bureau's forecast is that the volume of new supply in the coming months will average 9,625,000 b/d, 330,000 b/d higher than the final three months of 1957 and 110,000 b/d higher than had been predicted last January.

But a forecast by the Independent Petroleum Assn. of America places fourth-quarter new supply considerably less than that, averaging 9,450,000 b/d.

The latter forecast would now appear to be more realistic.

Both the Bureau of Mines and IPAA expect total imports to run about 1.6-million b/d in the last quarter.

But IPAA expects that domestic crude output will average only 7-million b/d in the last quarter, 150,000 b/d less than the bureau's forecast.

A sharp increase in refinery runs —which so far this year have been 5% under 1957—had been expected for the last quarter ever since the proposed new import plan was made known earlier this month (PW—Sep.12'58,p11).

The reason for this expectation was that the plan would allocate imports starting next July based on a percentage of refinery runs for the 12-month period ending next Mar. 31.

Since runs were curtailed sharply in the second quarter of this year—the first three months of that 12-month base period—it was believed that many refiners, particularly the smaller companies, would step up their runs to build a high run "history."

But at least three state conserva-

The Fourth Quarter Looks Better

(Bureau of Mines Forecast in 1,000 b/d)

	Fourth Quarter, 1958			Full Year, 1958		
	January Forecast	New Forecast	% Chge. from 1957	January Forecast	New Forecast	% Chge. from 1957
Domestic Demand	**9,580**	**9,595**	**+ 4.9%**	**9,024**	**8,999**	**+ 2.1%**
Gasoline	3,850	3,860	+ 4.5	3,900	3,866	+ 1.3
Kerosine	400	420	+ 6.9	290	316	+ 7.1
Distillate	2,150	2,160	+ 8.3	1,767	1,788	+ 5.1
Residual	1,600	1,545	— 0.5	1,492	1,437	— 4.5
All Other	1,580	1,610	+ 6.6	1,575	1,602	+ 6.2
Export Demand	**345**	**275**	**—20.1**	**345**	**270**	**—52.0**
Crude	30	10	—69.7	30	13	—90.5
Products	315	265	—14.8	315	257	—39.5
Total Demand	**9,925**	**9,870**	**+ 4.0**	**9,369**	**9,269**	**— 1.2**
Gasoline	3,940	3,940	+ 4.2	3,990	3,943	+ 0.5
Kerosine	410	425	+ 6.5	296	320	+ 3.6
Distillates	2,220	2,220	+ 7.5	1,837	1,832	+ 0.7
Residual	1,670	1,600	— 1.6	1,566	1,497	—10.4
All Other	1,685	1,685	+ 4.4	1,680	1,677	+ 1.1
Refinery Runs	**7,985**	**7,920**	**+ 2.6**	**7,927**	**7,630**	**— 3.6**
Total, New Supply	**9,515**	**9,625**	**+ 3.6**	**9,358**	**9,131**	**— 4.3**
U.S. Crude	7,115	7,150	+ 4.2	7,037	6,717	— 6.3
Gas Liquids	850	840	+ 2.7	824	800	— 0.9
Crude Imports	970	955	— 6.0	990	936	— 8.5
Products Imports	580	680	+13.7	507	678	+23.9

tion agencies—including the Texas Railroad Commission—appear set to hold supply tight.

The Railroad Commission made the first move to hold fourth-quarter supply down last week when it reduced the allowable for October by 246,555 b/d from the mid-September level.

The initial crude allowable for October is 2,957,936 b/d, based on an 11-day producing schedule, one day less than in September.

In New Mexico, the October allowable will average 331,093 b/d, up only 1,079 b/d from September.

Louisiana's Dept. of Conservation expects to continue for October the September per-well allowable, which set at 34% of the March 1953, depth bracket levels.

The effect of the state conservation agency actions will be to hold domestic crude production to about 6.8-million b/d in October.

With domestic crude output at a reduced rate next month and crude inventories extremely tight, refiners will have to cut back some from the present rate of runs.

Since mid-August, when refiners increased their operations noticeably, runs have averaged more than 7.8-million b/d. But in that same period, domestic production has averaged 7-million b/d.

The pattern of crude inventories since mid-August has been at or below what industry experts say is the "minimum working level."

Crude stocks last week declined to 240.7-million bbl., the lowest level since April 21, 1951.

With crude stocks in such a tight position, refiners for some time have been limited to current supply for their raw material. And indications are that available new supply next month will hold runs to less than 7.7-million b/d.

Such a level of operations will mean a continuation of the tight inventory of heating oils, barring an unexpected switch in refinery yield patterns in a higher output of distillates.

The sharp drop expected in exports for 1958 will hold their volume down to an average of 270,000 b/d, the lowest since 1922, when exports averaged 203,700 b/d.

And it is probable that U.S. oil exports will all but dry up during the next few years, barring an international emergency.

Crude exports, which back in 1939 averaged 197,000 b/d, are now expected to run only 13,000 b/d for 1958. Product exports, which reached a peak of 475,000 b/d in 1944, will average only 257,000 b/d this year.

Carson Gets Suggestions

Some specific proposals for changes in the tentative imports plan are being made to Matthew V. Carson, the imports administrator.

Carson, in publishing his proposed changes, provided a 30-day period in which to receive comments from the industry.

The Interior Dept. is not making the company proposals public, leaving that to a decision by the individual companies themselves. Thus far, some firms have released their proposals; others have not.

One company has publicly called for separate consideration for each district, rather than having the same ratios apply to all districts east of the Rockies.

Harry A. Logan, president of United Refining Co., of Warren, Pa., wrote Carson that his firm feels that the uniform treatment of Districts I-IV is the biggest weakness in the government's plan to switch to refinery runs as the basis for imports allocations.

"Its effect," Logan wrote, "would be to alter greatly the competitive pattern in the industry and to create unwarranted and unjust handicaps for certain refiners."

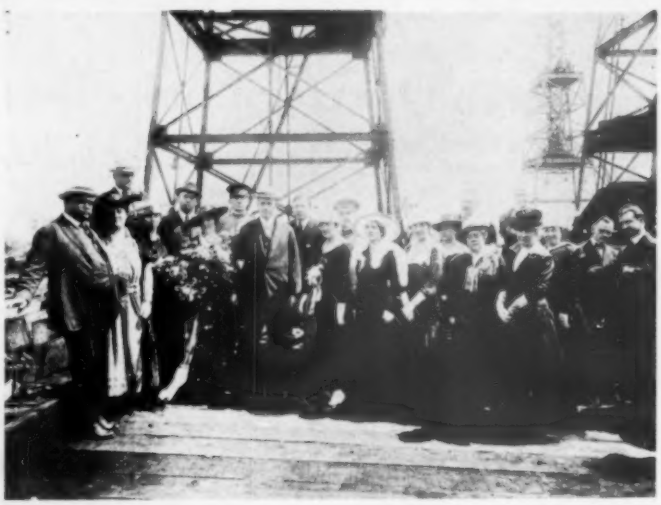
Logan noted that the vast majority of imported oil has always been processed in District I refineries, and that only quite recently have imports constituted any appreciable part of refinery runs in other regions.

Because past patterns vary so much by district, Logan feels it would be wise—and fairer—for the ratio of runs to imports to be established district by district.

One group believes that District V (West Coast) should be brought into the program, and that products should be included in addition to crude.

This group, the West Central Texas Oil & Gas Assn., also feels that the program will tend to encourage high refinery runs, and that it will give an unearned windfall to companies that will get quotas which they can't use, but can sell.

Oil Man's Album



It Might Be Pleasant to Revive This Custom

There was a time when quite a ceremony was made out of the dedication of a rig. Men and women, dressed in their Sunday best, attended. There were flowers and speeches and all the other trimmings—somewhat like a ship launching. This picture was made around 1905.

(No. 19 in a Petroleum Week series)

Oil's Interest in A-Bomb Grows, But . . .

Suspicious Russians and world politics may slow down development of peaceful uses of atomic energy. If not, the oil industry appears ready to get going.

Almost every major oil company in the U.S. is exploring the prospects of using atomic bombs to produce oil—some of them very seriously. But there's serious danger that the whole project may become a victim of the cold war.

The possibility of using nuclear blasts to help coax petroleum from old or reluctant oilfields, or to produce oil from shale, has been recognized since AEC's underground test shot in Nevada a year ago.

Project Plowshore has been created to explore peaceful A-bomb uses, under the direction of the University of California Radiation Laboratory, at Livermore, Calif.

The commission has been inviting interest from oil, mining, and electric companies ever since.

Upwards of ten oil and natural gas companies have made proposals to AEC for test shots in oil or shale formations. Several more have discussed the prospects with AEC experts.

In the words of an AEC official, "I think probably every big company in the U.S. has been in contact with us to one degree or another."

According to word circulating in both the industry and government, the firms most interested include Humble, Gulf, Union of California, Atlantic, Continental, Tennessee Gas Transmission, and Richfield of California.

Most serious interest appears to center around the possibility of using atomic bombs to retort shale in place.

For one thing, troubles in the Middle East have focused attention on the need for development of the tremendous domestic oil shale reserves—estimated at a trillion barrels or so—which lie untapped in the Rocky Mountains.

But, equally important, use of the atom to produce oil from shale appears more promising, up to now, than its use for secondary recovery of crude.

"Most companies that come in here are initially interested in secondary recovery," says an AEC official. "But when we get down to brass tacks, they usually agree there may be fewer problems in shale development."

Even the small, 1.7-kiloton bomb used in the underground test last year vaporized everything within a bubble 55 ft. in diameter.

Since considerable crude would be lost in such a blast, there is a question whether the venture would still be economical.

Still, there is a lot of interest in the ultimate possibilities.

There's optimism that shale can be retorted in place, with the oil being removed in a liquid or gaseous form at a cost competitive with today's crude operations.

If it proves feasible, this would allow producers to skip one of the largest costs of present processes—mining the shale in rock form and feeding it through a retort to extract the kerogen.

On the average, the Bureau of Mines has found, shale is 84% waste from the oil producing standpoint. Of the remaining 16%, two-thirds can be extracted as oil and about an eighth as gas.

Optimism regarding shale is frankly guesswork now. It will take some actual tests to find the real answers. And this is a long way off at best.

Last year's underground shot was fired in a sponge-like formation, called tuff, which is vastly different from the harder shale.

Experimentation must determine how large an atomic device is needed to crush or retort a given amount of shale.

Presumably, the larger the device, the better the possibility of economic shale development.

This fits nicely with AEC's inclination to experiment first in deep formations in order to be sure the blast is contained underground.

Meanwhile, there is also keen interest in use of A-bombs in tar sands.

Project Plowshare had several tests planned—but now there's a real chance that the upcoming diplomatic negotiations over a possible ban on A-bomb tests may put the whole project on ice for years to come.

AEC announced in June that it was launching studies to determine the feasibility of using a nuclear explosive to blast out a harbor in northwestern Alaska around 1960.

Two months later, plans for an underground test shot in New Mexico next summer were announced—this one for the purpose of studying feasibility of using bombs to produce radioisotopes, and steam for electric power.

And only a month ago, AEC experts met in Laramie, Wyo., with shale experts from the Bureau of Mines to pool their knowledge.

The commission had tentatively planned a meeting in October with the Bureau of Mines and interested oil companies to get down to brass tacks on technical and economic factors.

However, this meeting has now been called off indefinitely. And until such an exchange of views is held, Project Plowshare—from the oil industry's viewpoint—is on the shelf.

The complicating factor is the effort of the U.S., United Kingdom, and Soviet Union to reach an agreement on cessation of nuclear weapons testing.

A preliminary meeting already has resulted in agreement that it is technically possible to set up a check system to enforce such a ban.

Now, representatives of the three countries are slated to start negotiations Nov. 1 looking toward an actual ban.

President Eisenhower and AEC officials have clearly indicated that they want to exempt peaceful uses of atomic explosives from the ban.

However, Russian spokesmen have made equally plain their suspicions that peaceful A-bomb blasts are a subterfuge for continued bomb testing.

With Project Plowshare thus shaping up as a major point of dispute in the negotiations, AEC appears to be putting the wraps on the project.

Citing alleged lack of interest among affected industries, officials now say the Alaska harbor may not be blasted out after all.

And there's quiet pessimism at high AEC levels that U.S. negotiators might give in to the Russian stand against peaceful atomic blasts if they can thereby accomplish a larger objective.

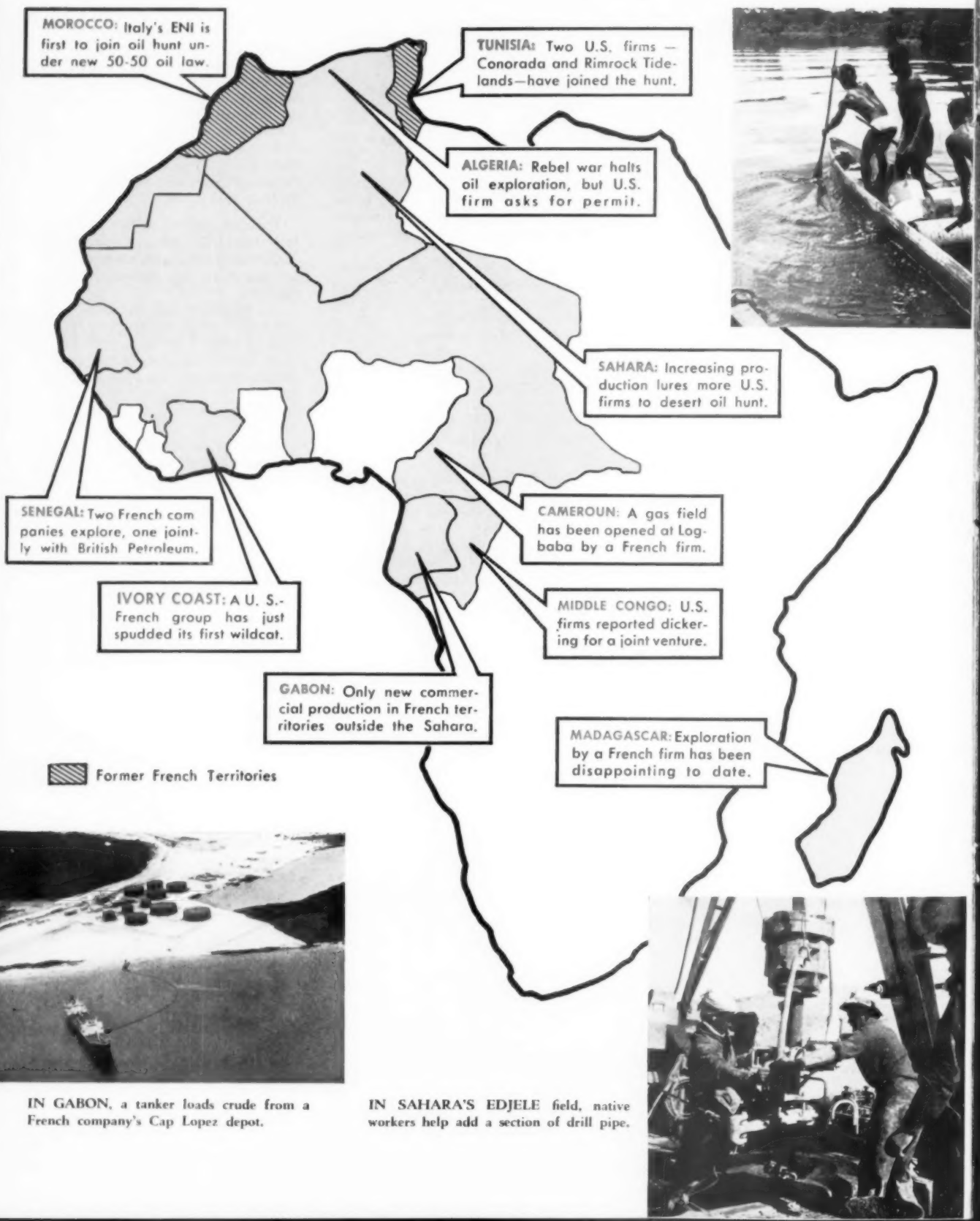
Dr. Willard F. Libby, AEC commissioner and foremost champion of Project Plowshare, says "there is no reason why any nation should object to peaceful use of atomic explosives."

"We can allow observers, and otherwise take steps to show that tests are entirely unrelated to weapons development," he says.

Libby scoffs at the idea that any test ban might include Project Plowshare.

"Although there are certainly some scientists who doubt that this thing ever will be practical, a lot of real enthusiasm has developed," he says. "I think it would be tragic if we were to stop now. Even if the ban were removed in later years, it might be difficult to recreate the same interest."

French Africa: Will It Be the World's Next


MOROCCO: Italy's ENI is first to join oil hunt under new 50-50 oil law.
TUNISIA: Two U.S. firms — Conorada and Rimrock Tidelands—have joined the hunt.
ALGERIA: Rebel war halts oil exploration, but U.S. firm asks for permit.
SAHARA: Increasing production lures more U.S. firms to desert oil hunt.
SENEGAL: Two French companies explore, one jointly with British Petroleum.
IVORY COAST: A U. S.-French group has just spudded its first wildcat.
CAMEROUN: A gas field has been opened at Logbaba by a French firm.
MIDDLE CONGO: U.S. firms reported dickering for a joint venture.
GABON: Only new commercial production in French territories outside the Sahara.
MADAGASCAR: Exploration by a French firm has been disappointing to date.
Former French Territories

IN GABON, a tanker loads crude from a French company's Cap Lopez depot.

IN SAHARA'S EDJELE field, native workers help add a section of drill pipe.

Major Oil Province?

U.S. oil men seeking permits in French Africa—a vast area stretching from Algeria down past the Equator—are a common sight these days in Paris's plush Hotel George V.

First stop for these oil men is the Bureau de Recherches de Petrole (BRP), where English spoken with a southwestern drawl filters through many closed doors.

Here the oil man will find maps, geological information, and—if he represents a company with sizeable capital, experience, and technical staff—a sympathetic ear.

BRP will explain the projected 50-50 Sahara oil law and the statutes governing exploration in Black Africa. As negotiations progress, the oil man will be invited to send geologists to look over the area that interests him. Finally, if he's willing to accept no more than a 49% interest in a joint venture with a French group, his company may get a permit.

The Sahara, where the Hassi Messaoud and Edjele oil areas promise substantial production by 1960, is the first African territory U.S. oil men ask about.

Four U.S. companies, with their French partners, are already at work on acreage granted them earlier this year: Cities Service, Phillips, Sinclair, and Newmont Mining.

And Indiana Standard's Pan American, Transworld Petroleum (D. D. Feldman, Dallas), and the Canadian Delhi group are set to join them. So is Italy's Ausonia Mineraria, the first European company having no connection with international operations to get oil rights (PW—Sep.12'58,p13).

Up to now, large U.S. international companies have not jumped into the Sahara, since they are not satisfied with a minority interest in any permit.

Shell has been in the Sahara since 1952, and is part owner of the company that discovered the first Sahara oil, at Edjele (Creps). But U.S. international operators have not filed bids.

Standard Oil Co. (N. J.) has been negotiating with Cie. Francaise des Petroles for more than a year over terms of a projected joint venture. After both companies agreed on a 50-50 interest, the government reportedly told Jersey it couldn't have more than 49%. This led to a new round of negotiations, which have not yet been completed.

Despite their cold shoulder to 50% or more foreign interest, the French do want the help of competent foreign companies, and, as an inducement, have drafted a new Sahara oil law. It will replace the fuzzy legislation now in effect. Drawn on the lines of Middle East agreements, the new draft specifies 50-50 profit-sharing, including 12½% royalty and taxes.

France also wants help in speeding up exploration in its other territories in Africa.

And there its policy against more than 49% interest for foreign groups probably won't apply.

True, Plymouth Oil, Benedum-Trees, and M. L. Benedum were given only a 49% interest in their joint venture with a French company on the Ivory Coast. But British petroleum was given 50% interest in a company exploring in Senegal. And the Shell group, which just wound up negotiations with Soc. des Petroles d'Afrique Equatoriale Francaise (Spaef) on a joint venture in Gabon, got a 50% interest.

DESERT CAMPS spring up around Creps' Tiguentourine field in the Sahara.

Three U.S. majors—California Standard, Socony, and Gulf—are also dickering with Spaef for entry into the Middle Congo and Gabon, where production averaging about 10,000 b/d is expected for this year.

Oil companies wanting acreage in French Africa outside the Sahara are dismayed to find that no blanket oil law covers all territories (PW—Sep.19'58,p78).

At present, they are covered only by skeleton general regulations that leave such important details as royalties, taxes, depletion provisions, and required investments to the discretion of local governments.

U.S. companies are also faced with a troubled political situation in French Africa.

For the past four years, a bitter guerilla war has been waged against French forces in Algeria by Algerian rebels seeking independence. As a result, oil exploration north of the Sahara has come to a standstill.

Furthermore, the rebels, set up in the National Liberation Front, also claim the Sahara and its oil. Foreign companies have been "warned" several times against making agreements with France for Sahara exploration. Last winter, a rebel band attacked a Shell affiliate's desert convoy, killing several technicians.

Moreover, the 24-in. pipeline now being built to bring Hassi Messaoud oil to the Mediterranean will have to pass through rebel strongholds in the Atlas Mountains.

U.S. firms must take into consideration the possibility that the territories may some day be independent. And new governments, anxious to find new revenues, may make different demands.

On Sept. 28 citizens of France and its overseas territories will be asked to approve a new constitution, providing greater autonomy for Africa within a French community. Gen. Charles de Gaulle has warned African territories that they can get their independence by voting against the constitution, but that France would then cut off economic aid. (Algeria, considered part of territorial France, was not offered the choice.)

Here is a thumbnail sketch of present oil developments in French Africa:

SAHARA—Two oil-producing areas—and one major gas field—have been discovered to date. The Hassi Messaoud field, belonging to

Cie. Francaise des Petroles (Algerie) and SN Repal, has 16 producing wells. A limited production, 10,070 b/d in July, is being carried to the coast through a temporary 6-in. pipeline plus railroad.

Construction is about to start on a major 24-in. line from the field to the Algerian port of Bougie, to be completed in October, 1959. The French operators now expect producing capacity will hit 230,000 b/d beginning in 1961.

Cie. de Recherches et d'Exploitation de Petrole au Sahara (35% Shell) has three fields close to the Libyan border: Edjele, Tiguentourine, and Zarzaitine. At Edjele, 37 wells have been completed to date, of which 34 are productive. At Tiguentourine, 14 wells have been completed, of which 8 are oil wells, 4 are gas, and 2 are dry. And all seven wells completed at Zarzaitine are producers.

Optimistic estimates set 1960 production from the three fields at almost 100,000 b/d.

After hesitating over pipeline routes, the government recently gave preliminary approval for a route through Tunisia to the port of Gabes or El Shkirra.

At the nearby Hassi R'Mel gas field, owned by SN Repal, estimated recoverable reserves have been boosted to more than 17.6-trillion cu. ft—nearly twice those of the big Lacq field in southwest France. The problem now is: What should be done with all the gas?

ALGERIA—Exploration has been stopped by the Algerian war. Nevertheless, Cities Service and its two French partners, Prepa and Francarep, have recently asked for three areas, covering some 5,000 sq. mi. in northern Algeria. Two government-controlled companies have permits here: Cie. Algerienne de Recherches et d'Exploitation Petrolieres (Carep) and SN Repal. Carep has a field at Oued Guerterini, which produced 254 b/d in 1957.

GABON (French Equatorial Africa)—Spaef's four fields are now producing 9,200 b/d. They are Pointe Clairette, Ozouri, M'Bega, and Alewant. Spaef has a fifth field, Animba, close to Ozouri, which isn't yet producing.

MIDDLE CONGO (French Equatorial Africa)—Three productive wells have been found at Pointe Indienne by Spaef. Production in 1959 from these wells and the Spaef fields in Gabon is expected to be over 12,600 b/d.

IVORY COAST—U.S. independents—the only ones in French Africa outside the Sahara—have a wildcat under way near Abidjan. Drilling the well for Plymouth Oil, Benedum-Trees Oil, M. L. Benedum, and the French government-controlled Soc. Africaine des Petroles is Laughlin-Porter Drilling Co., Midland, Tex.

SENEGAL (French West Africa)—Two French companies are exploring, one jointly with British Petroleum. And U.S. firms are reported "interested."

Soc. des Petroles du Senegal, in which British Petroleum holds a 50% interest, has permits covering 15,360 sq. mi. Its first wildcat, No. 1 Balandine, is below 8,300 ft. in the Upper Cretaceous. (In exchange for the Senegal permit, BP has given the French a 50% interest in a venture in neighboring Gambia, a British crown colony.

Soc. Africaine des Petroles abandoned six tests last year, after one had shown traces of oil, and another traces of gas. In 1958, three tests have been abandoned so far.

FRENCH CAMEROUN—A gas field has been opened at Logbaba by the French government-controlled Soc. de Recherches et d'Exploitation des Petroles de Cameroun. A new test, being drilled on a new structure, N'Kapa, was below 10,000 ft. in August, after finding carbonic gas under strong pressure at 5,840 ft.

MADAGASCAR—Exploration has been discouraging up to now. The government-controlled Soc. des Petroles de Madagascar, with a permit covering almost 65,000 sq. mi., has encountered only a few traces to date.

Two former French territories—Tunisia and Morocco—are attracting interest too.

In Tunisia, Conorada Petroleum Corp. was granted over 11,000 sq. mi. (PW—May2'58,p38), and has now started on its program. And Rimrock International Co. is about to receive some 6,000 sq. mi.

Soc. de Recherches et d'Exploitation des Petroles en Tunisie, which is owned mainly by the French and Tunisian governments, has a gas field at Cap Bon, which produced 583,000 cu. ft. daily in 1957.

In Morocco, Soc. Cherifienne des Petroles, owned by the French and Moroccan governments, is producing some 1,500 b/d from seven concessions. And Italy's Ente Nazionale Idrocarburi recently entered the exploration picture under a 50-50 profit split plus 50% partnership with the Moroccan government (PW—Aug.1 '58,p71).

Oil legislation in the two countries is based on a 50-50 profit split. Tunisia recently added the equal-profit-sharing clause to its 1948 oil law, before granting a permit to Conorada. The government gets 15% in royalties, the rest in taxes, and offers no depletion allowance. Government participation is provided for, but not obligatory. The recent grants do not include it.

Morocco has just enacted a new oil law comparable to Iran's. It gives special treatment to companies accepting government participation of either 50% or 34%. Exploration permits are automatically converted to development rights on discovery of oil. Individual companies may offer the government more than a 50-50 profit-split. After meeting local needs, 50% of the oil may be freely exported. The rest is subject to export license.

The big news in refining is the decision of seven companies—including Jersey Standard and Socony Mobil—to build the first major refinery in French Africa.

The 40,000 b/d plant, to be built "as soon as possible" in Algiers, will refine Sahara crude. Other companies involved are British Petroleum, Shell, Cie. Francaise des Petroles, Cie. Francaise de Raffinage, and Berre.

The growth and potential of French Africa's markets continue to attract oil companies.

The future of the marketing segment here depends on the speed of future industrialization. If present plans materialize, the market is expected to bloom.

In 1957, French West Africa, French Equatorial Africa, and Cameroun consumed about 2.5-million bbl. of motor gasoline, 1.2-million bbl. of gas oil, and 800,000 bbl. of kerosine.

NEXT WEEK in Petroleum Week

The increasing depths to which more and more holes are now being drilled has caught the interest of the entire oil industry. Drill bits are already probing around 25,000 ft. in West Texas, and it appears to be just a matter of time until someone goes to 30,000 ft.

There is drama in this onslaught on depth barriers, but there are problems and economic questions, too.

For an analysis of the impact of the superdepth era on the drilling industry, read next week's Special Report on drilling.

What's New / IN THE INDUSTRY

Deep well derby: The No. 1-EE University hit 25,000 ft. this week, and was running logs. The Phillips Petroleum Co. test, in Pecos County, is still in Simpson sand. Meanwhile, the No. 1-A Montgomery is at 23,400 ft., with the crew attempting to recover tubing which pulled apart while testing at 22,600-800 ft.

•

OCAW is still trying to find a way to pump life into wage negotiations. The union's bargaining policy committee met last weekend but failed to come up with any proposals. Instead, it simply reported "no progress" in wage talks. The problem was being discussed further this week during the union's annual convention at Long Beach, Calif.

Aside from contract problems, the convention is concerning itself primarily with internal union business, including the issue of whether to raise union dues.

•

Private U.S. investments in foreign petroleum now total more than $9-million, the Commerce Dept. reports. This includes $1.7-billion invested during 1957, of which Latin America got $1-billion. Investments in Canada were increased $400-million last year, while $200-million went to Western Europe and $100-million elsewhere overseas.

•

A nylon oil barge was demonstrated in England last week. It is a 10,000-gal. container which, while being unloaded, can be wound up on a reel for easy transportation. Its measurements are: diameter, 5 ft.; length, 100 ft.; weight, 2,300 lb.

Experiments with nylon barges have been under way in several countries for two years or more. The Englishmen who staged last week's demonstration say they are ready with immediate development and manufacturing plans for sizes up to 1,100 tons. Such barges are planned for inland and coastal waterways.

•

Three firms have been slapped with charges of illegally fixing tank wagon prices in the El Paso (Tex.) area. The Texas attorney general has filed such charges against Standard Oil Co. of Texas, El Paso Natural Gas Products Co., and The Texas Co. The suit charges that artificially high prices have been maintained in El Paso, giving an advantage to marketers across the river in Juarez, Mexico.

•

A steady but unspectacular oil growth in Alaska is expected by the Chamber of Commerce at Anchorage. The chamber's survey was made by James W. Dalton, a resident of Alaska for 28 years, who has made other oil and gas studies. Dalton foresees steady development during the next decade, but notes some limiting factors—such as high initial cost of exploration and a small market in Alaska—which he thinks will prevent any sudden boom.

•

Iraq and Iran both set new production records last month. Iraq's 787,042 b/d was 35,000 b/d above its old mark, while Iran's 879,000 b/d was 33,000 b/d above.

•

Thefts of oil maps continue to crop up. In Houston, federal authorities said two men violated copyright laws in reproduction of oil survey maps belonging to Edgar Tobin Aerial Survey Co., of San Antonio.

INSIDE *Slant*

MIDDLE EAST COMPETITOR

An interesting new angle has been developed on where shale oil fits into the over-all picture.

Fred L. Hartley, vice-president for research, Union Oil Co., says it will be in economic competition with Middle East crude.

He told this week's meeting of the American Institute of Chemical Engineers at Salt Lake City that dependence on the Middle East greatly influenced the time schedule for creation of a shale oil industry, before drawing this conclusion:

"We visualize shale oil as potentially competing, not with domestic production, but with presently cheap foreign oil.

"As the countries of the Middle East inevitably raise prices above some yet-to-be determined level, shale oil will be brought into the marketplace by economic forces. A future shale oil industry, then, will act as a long-term price stabilizer to offset price increases in foreign crude oil."

Before making his conclusions, Hartley also stressed that Middle East oil is now, and has traditionally been, cheaper than oil from other sources.

He also recognized the fact that living standards there depend on selling oil, not just producing and storing it.

Leroy Menzing
EDITOR

Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
September 26, 1958

The Senate Small Business Committee wants to guard the interests of small refiners in any new imports program. Committee staff members are helping to arrange a meeting in Washington next week between a group of independent refiners and the Small Business Administration. The refiners want a larger share of imports—a special "set-aside" similar to the arrangement for military purchasing. Meanwhile, SBA has sent letters to some 170 small refiners seeking their reaction to the new imports plan. Answers will be used by SBA to formulate an official agency position on the Carson proposal.

The possibility of mandatory controls—if importers refuse a new plan—is being talked by Administration officials. First, there is a general belief that any new plan probably will be substantially that proposed by Carson. If and when the Cabinet committee adopts such a new program, and if there is substantial noncompliance, mandatory controls probably would result, informed officials say. But the policy-makers still hope to avoid such an outcome.

•

Transfer of the oil-pricing case to Tulsa must await Justice Dept. action on returning evidence. There is still an amount of company data—used by the Alexandria grand jury—in the hands of government attorneys. In approving a change of venue to Tulsa, Judge Albert V. Bryan said the government must first return the evidence to the companies. This and other problems are expected to delay a start of the Tulsa trial until next year.

•

The Federal Power Commission soon will make some important decisions in the Midwest gas case. An immediate problem for FPC is to decide on a request by Midwestern Gas Transmission Co. for a Nov. 1 ruling on the proposed Tennessee-to-Canada pipeline. The commission is studying the request, along with statements of opposition by other companies, and will decide whether to skip an examiner's hearing and schedule early oral arguments before the commission itself.

•

The Justice Dept. is proceeding with its case against the El Paso-Pacific Northwest gas merger, paying no attention to the current Federal Power Commission hearings. District court trials are scheduled to start in November in Salt Lake City. Government attorneys will oppose any attempt by the companies to inject the FPC hearings into the trial, arguing that FPC has no authority to rule on stock transfers and that the agency's findings, therefore, should have no bearing.

•

No new land conservation laws are expected to be enacted by Congress until 1961—when a recently appointed Presidential commission will report on the uses of public lands. Congress is expected to shelve all proposed legislation in this field until the commission report is received and studied. Thus, the upcoming hearings by the Senate Interior Committee, scheduled in several Western states in November, probably will have little result. The committee hearings will be on legislation to limit or ban outright oil and gas operations in some public land areas.

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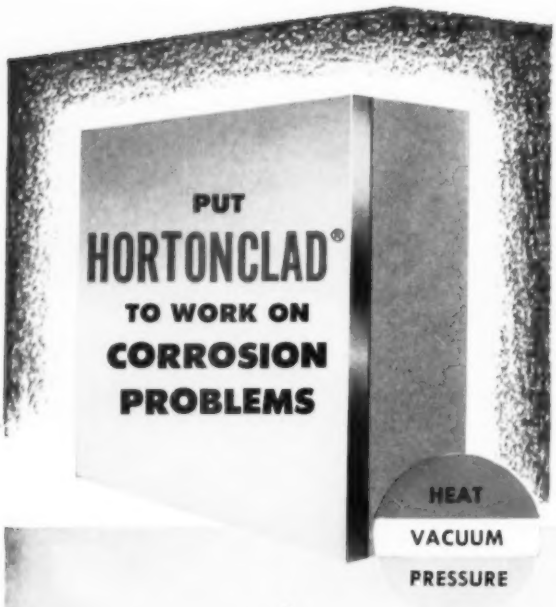

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Two crude columns (left) and vacuum column (right) were partially clad using Monel Hortonclad and stainless steel. Crude columns are 174-ft. high. Vacuum column is 28-ft. in dia. at widest point and 125-ft. high.

P71-C

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CB&I

Soviets Single Out Oil as Special Target

Have you heard that American oil companies in Venezuela used "special chambers" to lock up political prisoners dangerous to former dictator Perez Jimenez? Or that "Standard Oil" is now shipping arms from Israel to Venezuela to put the dictator back in power? Or that Western oil companies used "bayonets" to try to stop Iran from negotiating a 75% oil deal with the Italians?

If you haven't heard this juicy news, you obviously haven't been listening to the Soviet propaganda broadcasts.

But before you laugh this "news" off for the nonsense that it is, remember that millions of people around the world are hearing this "oil-and-blood" line drummed at them as straight "facts."

Soviet attacks against Western oil companies are nothing new. But what may be of major significance is that this attack is now being stepped up quite sharply.

The Kremlin is clearly singling out oil as a special target of its psychological warfare. This is brought out in an interesting 21-page study of the subject prepared by the Petroleum Industry Research Foundation.

The study analyzes recent propaganda broadcasts from Radios Moscow, Prague, Budapest, Peking, etc., beamed to foreign areas in the language of those areas —and designed to influence particularly the illiterate and semi-illiterate masses in the Middle East, Far East, and Latin America, to whom the radio is the chief source of information.

These broadcasts reveal four main Communist lines of propaganda attack:

* * * *

First, the Soviets are attempting to link Western oil companies with all political conflicts in areas in which they operate, even when they are not at all involved.

Sample: Though Venezuela's oil policy was not an issue in the ouster of President Perez Jimenez early this year, Soviet broadcasts to Latin America claim Jimenez was the "hand-picked front man" for the foreign oil companies, and that they are conspiring to bring him back. (The fact that the succeeding government has not changed Venezuela's oil policy is simply explained away as a sign that the revolution has not yet achieved its real goal.)

Sample: In the Indonesian civil war, Soviet broadcasts paint the Sumatra rebels as hirelings of Caltex and Stanvac, though Indonesia's policy toward foreign oil companies never entered into the dispute.

Sample: The recent revolt in Iraq was chalked up by Red broadcasts as a rousing defeat for Iraq Petroleum Co. (The fact that the new regime has repeatedly announced its intention to honor the IPC concession is simply being ignored.)

* * * *

Second, the Soviets are trying to paint all U.S. foreign policy moves as designed solely to preserve the interests of U.S. "oil monopolists."

Sample: Despite the fact that U.S. Marines were sent to Lebanon and British troops to Jordan at the requests of those two governments, Soviet broadcasts depict this "mobilization of the U.S.-British war machine" as merely concern over the profits of "Standard Oil and Royal Dutch Shell."

Sample: "Truman in his speech setting out a doctrine for Greece and Turkey stood on a barrel filled with petroleum, while Eisenhower and Dulles put forward their doctrine for the countries of the Middle East from a rostrum built by Rockefeller . . . ."

* * * *

Third, Soviet propaganda beamed to the producing countries drums the theme that the foreign oil companies are "looting" them of their rightful profits—but that Egypt's "victory" in restoring her rights over the Suez Canal shows how other small countries can "free themselves of the yoke of oil imperialists."

Sample broadcast to Iran: "American oil capitalists pose as benefactors helping Iran make profits from her oil. But they sell Iran's oil at prices 7 to 11 times greater than the cost. It is quite evident they are robbing Iran of hundreds of millions of dollars and ensuring the backwardness of Iran . . . ."

* * * *

Fourth, Soviet broadcasts to Europe strive to calm fears over possible loss of Middle East oil supplies if the concessions are expropriated. They claim that Europe won't lose access to the oil any more than it lost access to the Suez Canal.

The theme: private oil companies only stand in the way of the "natural trade relationship" between consuming countries and Middle East producing states.

Sample broadcast beamed to Britain: "It is not the oil supplies that are in danger, but the ill-gotten profits of the oil monopolists . . . ."

* * * *

Oil is vital to the entire free world today. For the producing nations, income from oil provides the sole means of raising living standards. For the consuming nations, oil is essential to fuel their transportation and industry.

What better way, then, for the Kremlin to disrupt both the consuming and the producing countries in one stroke than to disrupt the oil operations—and then to profit from the ensuing economic chaos?

LPG-Injection Test Proves Successful

Sun Oil Co.'s pilot propane-injection project in Millican Reef field, Coke County, West Texas, appears this week to have been an economic success—despite the tough engineering problems involved.

A heretofore unpublished report concludes that the project has paid for itself "in both current and ultimate recovery."

Here's why:

The LPG drive displaced at least 100,000 bbl. of stock tank oil—an estimated 80,000 bbl. more than would have been produced by continued straight gas injection.

Some 57,000 bbl. of this additional oil had been produced by June of this year, the remainder since then.

Project expenditures totaled about $43,000, and the net income from the additional 57,000 bbl. of oil recovered was estimated at $142,000. An additional $13,500 of revenue will be realized from recovered propane.

However, whether the over-all economics favor the LPG-drive type of secondary recovery for the entire field, or some other method, is now being determined.

"Complete evaluation of this method of operation [LPG injection] must include a comparative study of costs, risks, and expected benefits with the more conventional blowdown, followed by possible low-pressure waterflood," the report says.

(With the blowdown method, the field would be produced as a gas field until the gas-oil ratio dropped, then produced as an oil field.)

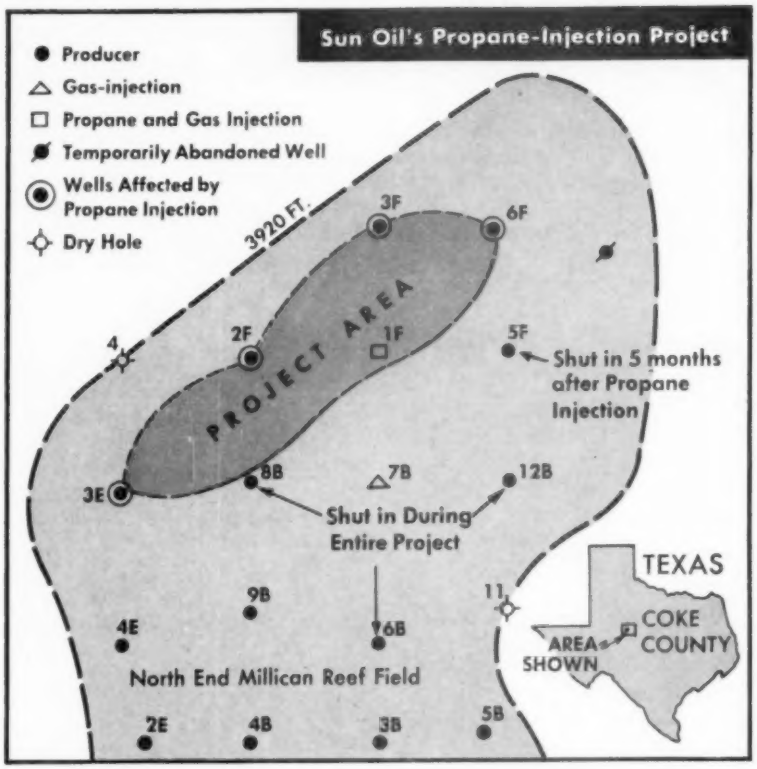
If it takes too long to recover the investment in an LPG injection program for the entire field, another method might be considered more economic.

But there is little question, according to the results of the pilot test, that an LPG drive will work, and will produce considerable additional oil.

The pilot project indicates that additional recovery, field-wide, may run between 1-million bbl. and 4-million bbl., provided enough LPG is used.

"While the results of the pilot program do not serve to indicate directly the additional recovery to be expected from larger slugs of propane, theoretical considerations indicate a possible additional recovery of 4-million bbl.," the report notes.

At a minimum, the report adds, the increase in recovery with LPG injection over that of straight gas injection should run "at least 1-million bbl."



PILOT PROJECT: Results of the program in one part of the Millican Reef field will help determine whether LPG-drive recovery is economical for the whole field.

Sun has accomplished something else it set out to do with the project: It has learned some of the "do's" and "don't's" involved in such programs.

Sun went into the Millican Reef program with full knowledge that it was something of a gamble.

The company knew that it would be difficult to set up controls in the reef-type field, even though the project was located in a part of the reservoir considered free from gas-cap interference.

The biggest uncertainty lay in determining how much of an LPG slug would be necessary to sweep the formation adequately—and there wasn't sufficient time for a research program to find the specific answer.

As expected, setting up of controls was difficult.

And the results of the pilot program show that "the propane slug should have been three to five times as large as it was."

The big problem to be solved was how to counteract the fast buildup of gas saturation and pressure in the field as crude was withdrawn.

A substantial amount of the oil in place had already been taken from the reservoir.

This had caused the saturation to build up to an average of 16,000 cu. ft. of gas per bbl. of oil in the four wells used as producers in the project.

And the rate of production for the field is, in effect, governed by the gas-oil ratio. Here's why:

All of the gas produced is stripped out at the nearby Jameson plant and reinjected. Oil production, therefore, is limited to the amount of gas the plant can handle.

It was hoped that LPG injection would reduce the gas-oil ratio, permitting a faster recovery of oil.

Laboratory findings had pointed to the LPG drive as a possible solution.

It appeared that the pressure, temperature, and composition of the oil in the field were suitable to the proc-

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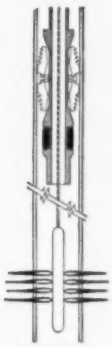

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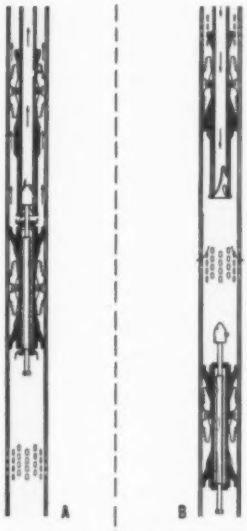
SWAB AND TEST

or use it with a **BAKER RETRIEVABLE BRIDGE PLUG** for as many straddle operations as required... in **ONE ROUND TRIP!**

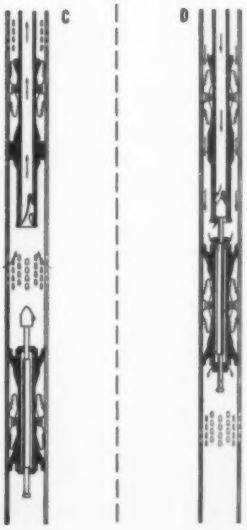


Run tools in together

Release Plug, straddle interval, fracture or acidize

Swab and Test

Pick up plug, move to next interval



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ess. Straight gas-injection facilities were already in operation, and LPG was available from the Jameson plant.

Some of the laboratory studies had indicated that as little as 1% to 3% of the hydrocarbon pore volume to be swept might be sufficient. If so, LPG-slug injection could be quite profitable.

Since field operations would not be disrupted, it was decided to go ahead with the program as something of an experiment.

Because of reservoir conditions, the project was difficult to program and carry out.

The MRU 1-F well was selected for LPG injection, and 14,000 bbl. of propane-butane mixture (85% propane) were injected, followed by dry gas.

It was hoped that the program could be confined by balancing production from MRU 2-F, 3-F, 5-F, and 6-F with gas injection into MRU 1-F, and by adjusting gas injection rates in MRU 7-B to hold about the same bottomhole pressures in the two injection wells.

A potentiometric model study by Sun's production research department indicated, however, that the isolation could not be achieved, and that LPG would migrate toward MRU 3-E and would not reach MRU 5-F because of interference from gas injection in MRU 7-B.

This same study, however, confirmed the initial plan of distributing production in proportion to the volume of reservoir between producing and injection wells.

Gas-oil ratio tests soon confirmed the model study forecast, and MRU 5-F was shut in in February, 1957, with MRU 3-E being put on the same test schedule as the other producing wells.

Actual reservoir behavior differed from the hoped-for results.

The ideal would have been for each producing well to show a gas-oil ratio decreasing to the solution gas-oil ratio —about 1,000 cu. ft. per bbl—and remaining at that level until injected LPG appeared in high concentration in the production stream.

Instead, there was a decrease in the gas-oil ratio from the high average of 16,000 cu. ft. per bbl. only to about 8,400 cu. ft. per bbl.—followed by an increase.

Injected LPG appeared at about the same time that the gas-oil ratio trend reversed—and in very dilute concentrations.

There are several possible explanations for the reservoir behavior.

One is that the LPG formed a miscible front, which progressed for some distance, then dissipated because of its dilution with gas left behind as the front passed.

Another possible explanation, according to the report, is that the reversal of the gas-oil ratio and the almost simultaneous appearance of injected LPG indicated the arrival at the producing well of the first of several fronts, each following a stringer or channel of continuous permeability, and each maintaining conditions of miscibility all the way from the injection well to the producing well.

Calculations indicate that the 100,000 bbl. of stock tank oil were displaced before this apparent dissipation occurred.

Both of these possibilities are considered extreme, the report adds. The real explanation of true reservoir behavior probably lies somewhere in between the two possibilities, it notes.

At any rate, the LPG-drive method worked well enough to show that it could bring more oil to the surface, faster, than an injected-gas drive, and probably more than a waterflood.

Since the pilot project results showed that a slug three to five times the size of the one used would be necessary, it meant that between 450,000 bbl. and 650,000 bbl. of LPG would be needed to flood the reef.

Sun engineers calculated that if this slug recovered the same ratio of oil as was recovered in the pilot program, an estimated 940,000 bbl. of oil would be recovered—823,000 bbl. more than could be recovered by gas injection.

Tentative calculations now are that the LPG method would recover 763,000 bbl. more oil than would be recovered with a waterflood.

Is Vibratory Drilling Worthwhile?

A long-range research program has shown that vibratory drilling may be just about economically competitive with rotary drilling, in rocks of medium hardness. But more work is needed on specific problems.

Drilling by vibration is accomplished by superimposing up-and-down vibrations onto the drill bit of an otherwise conventional rotary drilling system.

Vibratory drilling research has been carried out by the Battelle Memorial Institute, Columbus, Ohio (PW—Aug.9'57,p24). This week, Battelle's Ralph Simon told the Denver meeting of the American Society of Mechanical Engineers about the latest advances in the field.

The basic feature of all models of vibratory drilling systems is a column, the transducer, that is vibrated in the hole.

Several different field and laboratory models of transducers have been designed and used. The latest version is a nickel magnetostrictive transducer that follows a 10½-in.-diameter bit down the hole. This transducer is operated on electric power converted to magnetic power.

To be competitive, vibration must at least triple penetration rates achieved in optimum medium-hardness conditions by rotary drilling, according to Simon.

The reason for this, he said, is that the average cost of drilling a foot of hole depends on the ratio of the average cost of operation per unit of time to the average rate of penetration per unit of time, round trips included. Since the average cost of operation per unit of time would increase appreciably for vibratory drilling as compared with conventional rotary drilling, the difference must be made up by greatly increased penetration rates.

In extremely hard rock, says Simon, it is a relatively simple matter to multiply the rate of penetration several times with vibratory drilling, even with a transducer of poor design operating under far from optimum conditions.

However, the primary interest in oil well drilling is apparently in the economical drilling of rocks of medium hardness. And in this type of rock, says Simon, the required increase in power output to the rock might just about be achievable under optimum conditions of design and operation for a transducer that follows the bit down the hole.

The main aim of research thus far has been to develop a drill that would increase the amount of mechanical power focused on the rock. Besides the power developed by mechanical rotation, the transducer, which operates somewhat like a hammer, increases penetration by vibrating the bit in the hole at from 100 to 1,000 cycles per second.

Says Simon: "The rate of penetration should be proportional to the

mechanical power released on the rock formation. Thus, substantial increases in penetration depend on the development of means whereby the rate at which the rock will accept mechanical energy could be appreciably increased. This is the intended function of vibratory drilling.

"Results of fundamental study indicate that little would be gained by attempting to improve the efficiency of utilization of mechanical energy to break rock under the types of loading imposed by downhole conditions and within the strength limitations of present bit materials."

In field use, the vibrating element, the transducer, should be no longer than a section of drill collar—about 30 ft., says Simon.

"The use of two or more sections for the transducer, coupled by threaded joints, is undesirable," he says, "because of the excessive incidence of failure and the excessive vibratory power losses in such joints, unless they are fabricated in much greater precision than is tolerable for repeated making and breaking in the field."

Most of the research still needed on vibratory drilling is focused on the performance of the bit under vibration.

More work is needed on the force-displacement characteristics of bits on rocks, says Simon.

This involves calculations on how much efficient operation depends on the relative frequency of rotation and vibration of the bit.

Work could also be done on the possibility of developing bit designs more suitable for vibratory drilling than standard rotary bits, says Simon. And the theories developed by research using magnetostrictive transducers should be expanded to include other transducers, such as electrodynamic and electroacoustic instruments, he says.

"Theoretical and experimental work is also needed to correlate the force-displacement characteristics as a whole with the relationships among the forces, energies, and volumes of rock fractured out by the individual teeth of a bit," says Simon. "Although the weight of the bit, though normally constant, may fluctuate violently under some downhole conditions, the loads on individual teeth of the bit increase and decrease more or less slowly compared with the frequency of vibration. This depends on the speed of rotation and the position on the bit of a specific tooth.

"Hence, each cycle of vibration encounters a different loading condition as far as an individual tooth is concerned."

Electric Drive Systems Gain

Electric drive systems will become an indispensable part of future drilling operations, according to W. P. Stephens and A. H. Candee, of White Motor Co.

For medium or large drilling drive systems, they say, electric drive has certain advantages, because a complete electric drive will sever all mechanical ties between the engines and the driven machinery.

A prime advantage of electric drive systems is that engines don't have to be grouped together on an expensive platform adjacent to the derrick floor.

"Neither do the engines have to be rigidly grouped and lined up as when driving into a compound. Likewise, electrically driven slush pumps are given a new freedom of location," they say.

Another advantage: Over-all operating costs are reduced, they claim, because transmission efficiency is high, and the absence of mechanical transmission stresses strongly favors reductions in downtime, in repair expenses, and in depreciation.

To reduce operating costs further, electric transmission systems must be stripped to bare essentials.

On the premise that if equipment can fail, it will (see box, below), steps must be taken, they say, to eliminate every unnecessary apparatus, device, circuit, and contact, until the system is down to the least possible number of parts.

Stephens and Candee spoke at the American Institute of Mechanical Engineers Petroleum Industry Conference, held last week in Dallas.

Murphy's Law

When considering electric transmission systems, say W. P. Stephens and A. H. Candee, of White Motor Co., it's important to bear in mind the laws set down by a legendary Mr. Murphy:

- If it can fail, it will.
- If it can be hooked up wrong, someone will do it that way.
- If it can be operated incorrectly, someone will operate it that way.
- All failures occur at the worst possible time and place.

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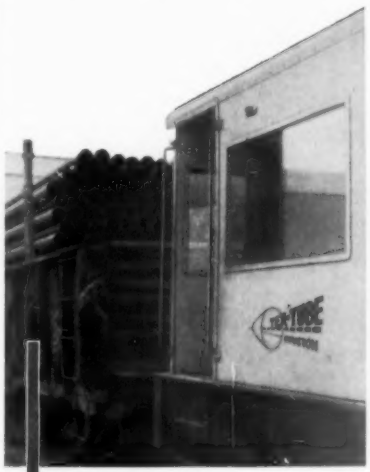

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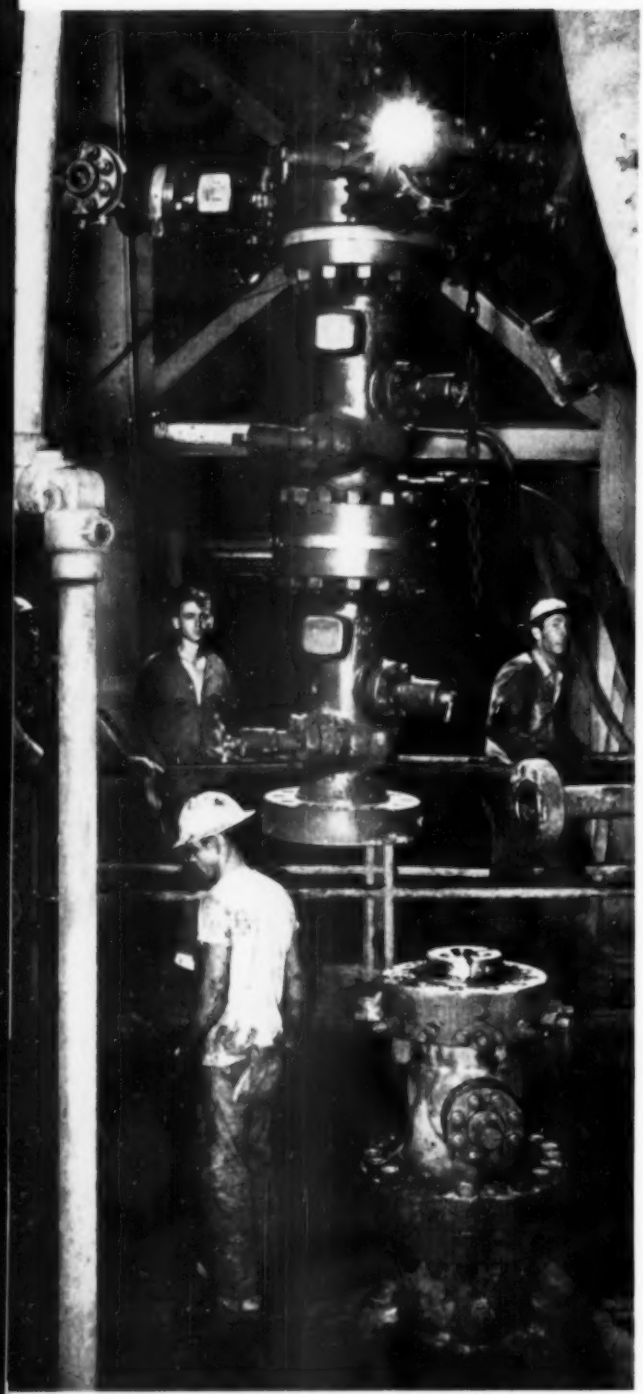
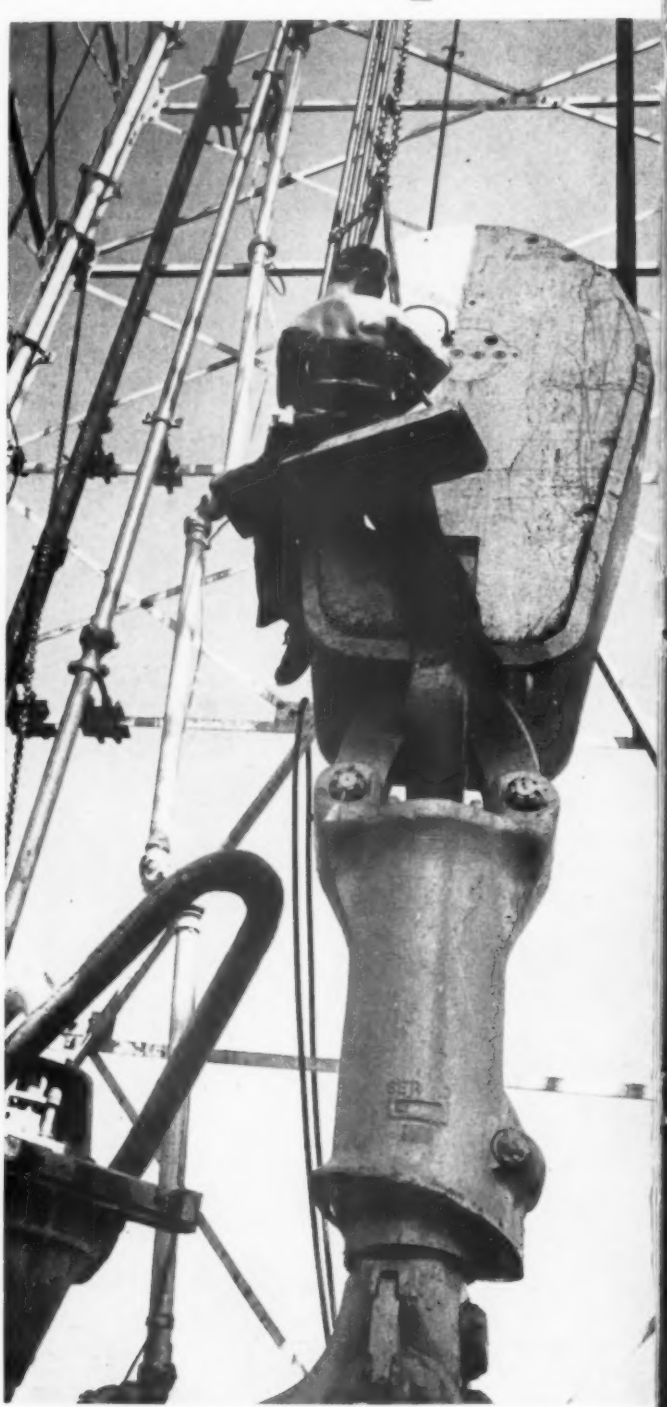


HUGE CHRISTMAS TREE, a Cameron API Series 1,500, with solid block valves, is lowered onto wellhead assembly.



DERRICKMAN is dwarfed by the giant equipment as he sits easily on a swing seat to grease the traveling block.

Completion

A successful Tidewater Oil Co. triple oil producer in a Texas offshore area underscored the fact this week that multiples demand careful, unhurried completion work.

The No. 1 State Lease 74, Umbrella Point field, Galveston Bay, Chambers County, Tex., was spudded July 9.

It required 23 days to drill, but 35 days to test and complete. Although a few of the completion days could be chalked up to the testing of a fourth—unproductive—interval, it still required more time to complete the well than to drill it.

Here's why: Workover jobs on multiple completions are expensive. It is necessary to pull the tubing not only from the bad zone, but from the good zones as well. All packers must be replaced, and that's liable to run into money, too.

So, it becomes much more important, from the financial standpoint, to insure isolation of producing zones and commercial, water-free production in a multiple than in a single completion.

The well is Tidewater's first triple, and one of the few such completions to date in Texas.

A development well, the No. 1 State Lease 74 was sunk in an area fairly well proved by Sun Oil Co. just to the west.

Water depth at the location is 11 ft.

The 100% Tidewater well was drilled by Brewster-Bartle Drilling Co., the contracting firm that drilled the recent history-making quadruple completion for the CATC group (Cities Service, Atlantic, Tidewater, Continental) off Louisiana (PW—Aug.1 '58,p22).

Tidewater, which has a ¼th interest in CATC, followed the quadruple work closely and "used that experience in this well," a company spokesman noted.

"It has paid off with a relatively untroubled operation," he added.

The triple completion required extensive perforating, drillstem testing, and squeeze-cementing.

The well went to total depth of

TEAMWORK and efficiency of the drilling crew, using power tongs here to break out pipe, played a big role in the success of Tidewater's triple.

IT'S TOO LATE TO DUCK the shower of drilling mud as drillpipe is pulled out of the hole on Tidewater's Texas offshore No. 1 State Lease 74.

(Photos by Paul Dorsey, Houston.)

9,600 ft. but was plugged back to 9,500 ft.

The producing zones are in the following perforated sections: 7,697-703 ft. (top of F-1A sand, 7,660 ft.); 8,269-74 ft. (top of F-5 sand, 8,254 ft.); and 9,076-78 ft. (top of F-15 sand, 9,036 ft.).

In all, there were ten perforating jobs, performed by McCullough Tool Co.

There were eight squeeze cement jobs and four drillstem tests to check them. Halliburton Oil Well Cementing Co. did both the cementing and drillstem testing.

There were another four drillstem tests for the production purposes, each job requiring two to three days.

The testing had to be done carefully because of the relative thinness of the sands.

A deeper sand was tested, but it showed 50% salt water, and the hole was plugged back.

The tubing and packer program followed the usual complicated pattern for a multiple.

Tidewater set 35-in. drive pipe to 65 ft.; 20-in. casing to 320 ft.; 13⅜-in. casing to 2,498 ft.; and 7⅝-in. casing to 9,566 ft.

As for the tubing, one string of 2 1/16-in. Hydril CS was set to 7,653 ft.; a string of 2⅜-in. EUE to 8,185 ft. (plus 792 ft. of 2 1/16-in. Hydril CS between packers); and a string of 2⅜-in. Hydril CS to 8,977 ft.

Packers were set at 7,653 ft., 8,215 ft., and 8,977 ft. The Brown Oil Tool Co. hydraulic packers were similar to those used on the CATC quadruple completion.

The procedure in setting the packers was the same as that used in the quadruple, except that there were three packers and three strings of tubing instead of four.

The packers were run into the hole in sequence, spaced properly on the first string of 2⅜-in. tubing, with the No. 3 (bottom) packer being placed on the tubing first. A special Brown coupling was used to connect the No. 3 packer to the tubing.

Testing indicates production rates in excess of 200 b/d for each of the zones.

On 3-hour tests, the zones showed the following: The upper zone flowed 233 b/d through 9/64-in. choke; the middle zone flowed 252 b/d through 10/64-in. choke; and the lower zone flowed 280 b/d through 16/64-in. choke.

Altogether, 987 sacks of cement were used in the squeeze jobs. In addition, 450 sacks, plus 12% gel, were set around the 20-in. casing; 1,250 cu. ft. of Pozmix A, plus 2% gel, were set around the 13⅜-in. casing; and 900 sacks of Sloset, plus 4% gel, were set around the 7⅝-in. casing.

The Christmas tree is a Cameron API Series 1,500, with solid block valves.

The triple completion showed substantial savings over the cost of drilling three single wells in the area.

Tidewater says it runs around $17,000 to prepare a location in the vicinity, so separate wells would have amounted to another $34,000 in this category.

Mud costs usually total around $20,000, so the saving here is about $40,000 as against three wells.

Casing costs ran about $36,000, which means a saving of about $72,000 for this item.

These are three of the key factors. There are other savings involved, as well, on such considerations as logging, and other services.

A. F. Brannon, Tidewater's area superintendent, was in charge of the well, working under L. D. Lott, district superintendent. E. W. Childers was Tidewater's drilling and mud engineer, and Sam Graham was the Brewster-Bartle Drilling Co. toolpusher on the job.

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The streamlined interior and exterior contours of Spang Extreme Line Casing insure maximum round-the-clock running efficiency. The rugged integral joint is 100% leak-resistant.

Spang Extreme Line Casing runs in faster, has 100% leakage resistance!

Drilling crews like to work with SPANG Extreme Line Casing because it's easy to handle. When they're running-in, only 5 to 7 turns with the spinning line and less than one turn with the tongs are necessary. It's very easy to stab, *cannot* be cross-threaded, and its positive shoulder contact engagement prevents overtonging. But there are more good reasons.

The streamlined interior and exterior contours of this high quality casing provide for maximum running efficiency—no shoulders to hang-up on hole projections, or to scrape mud seal from the walls of the hole. SPANG'S high strength integral joint provides a minimum of threaded connections—and this means less possibility of joint trouble.

Precision-manufactured SPANG Extreme Line Casing pays off *in* the well, too. It has the mechanical and metallurgical properties to withstand high tensile loading, and to resist the severe pressures found in present-day deep drilling. Its rugged integral joint is 100% leak-resistant—a highly important factor in deep, high-pressure wells. Another outstanding fact is that SPANG Extreme Line Casing can be salvaged and re-run repeatedly.

You can easily get more information about this quality casing *in terms of your specific needs* by calling the National Supply representative in your area. Find out soon how SPANG Extreme Line Casing can save you money in the long run.

Spang Casing ready for action on a well in Texas. You can get Spang Extreme Line Casing in three grades for every well condition–J-55, N-80 and P-110. The O.D. size range is 5" to 9⅝".

Another outstanding Spang product on the next page!

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Athabasca Future Hinges on Markets

Look for a speedup in development of Alberta's Athabasca tar sands region in the next few years, when expected markets in the Great Lakes region open up.

"Regarding future marketing, oil from the Athabasca tar sands will be in a favorable position," says D. S. Pasternak, of the Alberta Research Council. "Existing pipelines are within 250 mi. of the tar sands area. Exploratory costs per barrel of oil are relatively low. And it's both simple and economic to recover oil from the tar sands by surface treatment."

When markets expand, development will depend—even more than now—on a successful in situ recovery process. Surface mining, it is estimated, will recover only a small portion of the 100-200-billion-bbl. reserves.

Due to the high viscosity of the oil and the lack of a reservoir drive, ordinary production methods are of no avail.

Several surface-mining methods have been proposed. Of these, the Research Council considers the hot-water washing process to be the most promising. In this, oil is recovered as a froth containing around 30% water and about 5% mineral matter. Augmenting the primary yield by passing the underflow from the water settler through a conventional flotation cell enables a recovery of at least 95% of the oil.

For open-pit mining, the Blair report, made in 1950 for the Alberta government, declared that it would be economical to remove up to 1 ft. of overburden for every 2 ft. of good-grade tar sand lying underneath. Only a small percentage of the tar sands occur under such favorable overburden conditions, however.

If in situ combustion proves to be applicable to the tar sands, there would be a vast scope in the area for this type of recovery, says Pasternak.

Drilling costs would be low, because of the relatively shallow depths at which much of the tar sands occur, he says. A question mark, however, is whether satisfactory communication can be established through both the good-grade tar sand and the interbedded varieties, and over what distances, since the sediments in the tar sands are unconsolidated.

"Currently, the subsurface combustion method, or some variation of it, appears to hold the most promise for development of the tar sands," says Pasternak.

Miscible phase displacement is also under consideration. But, says Pasternak, any application of this method in the tar sands area would have to take into account the high viscosity of the tar sand oil, the low temperature of the deposit, the fact that only a portion of the sand oil is miscible with propane, and the fact that much of the area has a poor caprock cover.

Other methods of recovery have also been proposed, including electrovolatilization, and some method of heating the oil in situ, followed by a waterflood.

Geologically, the tar sands are lower Cretaceous sediments resting on Devonian limestones and shales.

The sands, which comprise a portion of the McMurray formation, are overlain by marine sediments. In general, the tar sands are about 125 ft. to 250 ft. thick, although some sections have been found to be as much as 400 ft. thick. Variations in thickness are due to variations in the topography of the underlying Devonian. The overburden varies from zero to 1,000 ft.

Sediments comprising the McMurray are massive, crossbedded sandstones, laced with clay and shale.

Exploratory core drilling to date has indicated that the area in Alberta underlain by tar sands may be as much as 5,000 sq. mi. But actual limits of tar-sand deposition are not known.

The clays and shales are considered to have originated from the Precambrian Shield to the east. Wide variations exist locally. There are no continuous beds of either sand or shale, and sections as little as ½ mi. apart cannot be correlated closely.

Examination of the logs and core analyses of drill holes indicate that, on the average, the tar sand deposit consists of about one-third good-grade tar sand and shale, in beds 5 ft. thick or more, one-third interbedded tar sand and shale, and one-third barren shale.

The beds that consist of comparatively clean sand are well-filled with oil and constitute the good-grade tar sand oil. In the case of the interbedded sand and shale, only the sandy portions of the sediments are well-filled with oil. The shale beds contain oil to a small degree, or not at all.

Pasternak discussed the development of the tar sands at this week's meeting of the American Institute of Chemical Engineers, in Salt Lake City.

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these securities. The offering is made only by the Prospectus.

NEW ISSUE

September 10, 1958

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What's New / IN EXPLORATION, DRILLING, PRODUCTION

Is Drilling Equipment Too Big for the Job?

The oil industry is using a costly, sledgehammer approach to drilling and production, instead of sizing its equipment to the actual job and improving portability, say two Humble Oil & Refining Co. engineers.

Harry Pistole and Martin E. True told the American Society of Mechanical Engineers meeting in Denver that, "The mining and construction industries wouldn't think of using 50 trucks to move 15 loads of material, yet the oil industry is digging 8⅝-in., 10,000-ft. holes when 4¾-in.-diameter holes would do."

The same thing goes for production equipment, they asserted, where the industry is spending about $1-billion annually for purchases.

A total of 437 wells having hole sizes ranging from 4¾-in. to 6½-in. had been drilled by one operator as of the first of this year, with a total savings of nearly $3-million, they said. This operator, they added, had completed 28 wells with 2½-in. oil string, and in many of these wells, no tubing string was needed.

They also pointed to a skid-mounted, 4 ft. x 7 ft. ACT unit, now in experimental use.

"The challenge," they said, "is to develop realistically sized, major production units of high portability."

•

Second Unit Slated For North Dakota

North Dakota may soon have its second unitized field, the North Westhope field, Bottineau County.

The field is 140 mi. east of the first unit in the state, the Beaver Lodge-Tioga field, in Williams County.

The unit agreement is now being circulated among royalty owners and operators for ratification. Under the proposed agreement, a waterflood will be put into operation in the southern part of the field. Oil will be produced from the north end of the field.

Ward-Williston Drilling Co. is the principal operator, holding 74% of unit participation.

Engineers estimate that waterflooding would double the field's ultimate recovery. Thus far, the field has produced more than 577,399 bbl. of oil. Part of the eastern side of the field is a U.S. Fish & Wildlife game reserve. Nothing can be done to conserve the oil that will be lost to the reservoir underlying the reserve, because no wells can be drilled on the property.

•

Leasing News

Nearly 40,000 acres of Colorado state lands will be offered for lease Oct. 1.

Yuma County, in the southeastern part of the state, contains 19 of the 77 tracts offered.

Beginning with this sale, recent amendments to leasing regulations will go into effect. These amendments provide that any tract offered will be subject to sealed bids of not less than $10 per acre, plus rentals and filing fees. Advertised tracts not leased by sealed bid will be subject to oral bid after sealed bids are read. Tracts remaining after this will be offered on a first-come, first-served basis.

The Sept. 16 sale of leases on North Dakota state lands brought bonuses totaling $12,266. A total of 11,372 acres were leased.

Highest bonuses, from $3 to $3.75 per acre, were paid for lands in Bowman, Mountrail, and Stark Counties.

Continental Oil Co. was high bidder at the Sept. 18 sale of leases on Wyoming state lands.

The company paid $3,200 bonus for a 160-acre tract.

Lands offered were in Park, Big Horn, and Weston Counties.

Montana's fourth oil and gas lease sale will be held Oct. 30, in Helena.

The fifth and last sale of the year will be held in early December.

Revenues from the first three sales totaled $120,337.

A sale of Navajo allotted lands in New Mexico will be held Oct. 22.

Altogether, 85 tracts, totaling 13,551 acres in McKinley, San Juan, and Sandoval Counties, will be offered.

The Louisiana Mineral Board has indefinitely suspended its lease sales.

Blamed for the suspension are the low bids offered at the past few sales.

The Iberia Parish School Board will offer 2,098 acres for lease Oct. 8. Lease sales of parish agency land normally are handled by the Mineral Board.

The Oklahoma Land Office will offer 51 tracts for lease Oct. 20.

Tracts are in 11 counties. Fifteen of the tracts are in Cimarron County, just north of the Keyes gas district.

•

John H. DeFord will conduct a pilot thermal recovery project in Coleman County, Southwest Texas.

The project will be carried out on five acres of the E. E. Knight "B" lease, Coleman County Regular field. Plans call for nine producing wells and four injection wells to be drilled to the Amerada formation, at about 200 ft.

•

Plymouth Oil Co. is conducting a 44-test drilling program on a recently acquired 3,520-acre block in the Pembina field, Alberta.

Thirteen wells are on potential test, eighteen tests are drilling, and another thirteen tests will be drilled on proven locations. Plymouth hopes to complete the program by Dec. 1 of this year.

•

International Mining Corp. has bought Waterford Oil Co.'s 25% interest in about 275,000 acres in southern Louisiana. Purchase price was $7-million.

The properties, located along the Gulf Coast, yield a present total income of about $1-million per year. Most of this is from the production of natural gas. Located on the property are all or part of eight producing fields.

•

Sunset International Petroleum Corp. has acquired a 50% interest in about 72,000 acres in Alaska's Copper River Basin, northeast of Anchorage.

Tradewinds Exploration, Inc., in which Sunset owns a 19% stock interest, holds the other 50%.

The purchase was made from Polaris Oil Co.

•

Shell Oil Co. has asked the Texas Railroad Commission for permission to operate automatic custody trans-

fer systems on a permanent basis in several West Texas fields.

Applications cover production from the Sealy Smith lease, Monahans fields area, Ward and Winkler Counties; the H. L. Lowe lease, Wasson field, Yoakum County; the University 9-AA lease, Block 9 (Ellenburger) field, Andrews County; and the University "D" and "F" leases, South Andrews (Devonian and Wolfcamp) fields, Andrews County.

•

The U.S. Geological Survey has approved the Horn Canyon Unit, Sweetwater County, Wyo.

The block contains 22,432 acres, the majority of which is federal land.

Mountain Fuel Supply Co. is operator, and has spudded a test on the unit.

•

Miracle & Wooster Drilling Co. has spudded a test for Standard Oil Co. of California north of Seattle, Wash.

The test, in the Silvana area, will be taken to at least 5,000 ft. Standard has 25,000 acres under lease in the area.

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Great Western Oil & Gas Co. has bought nine producing wells in Oklahoma from Seminole Oil & Gas Corp.

The wells are located in the Sancho field, Seminole County. Great Western is planning to recomplete some of the wells to increase production.

•

The third annual petroleum conference on well logging interpretations will be held Oct. 15-17, at McMurry College, Abilene, Tex.

The conference is sponsored in cooperation with the Abilene Geological Society, the West Central Texas Oil & Gas Assn., and the West Central Texas section of the Society of Petroleum Engineers of AIME.

•

"Engineer Tax Men," an Internal Revenue Service booklet describing the work of engineers in the tax bureau, is available from the Assistant Commissioner (Technical), (Attn.: T:S:E:), Internal Revenue Service, Washington 25, D.C.

•

The University of Texas petroleum engineering department will present a lecture seminar on "Frontiers in Petroleum Engineering."

The series, which opens Sept. 29, covers current research, operational applications, and unconquered areas in oil and gas production. Lecturers will be executives, engineers, and research men from Atlantic Refining Co.

•

Drilling Highlights

West Texas—Lone Star Producing Co. No. 1 Clarence Porter, section 9, block 32, t3n, T&PRR survey, Borden County, was completed for 298 b/d of 43-gravity oil through ¼-in. choke and perforations in the Fusselman at 9,744-50 ft. The discovery is 1 mi. northeast of the one-well Clara Good (Fusselman) pool.

In Ector County, Slick Oil Corp.-Brown & Spiece No. 1 N. G. Story, section 8, block B 15, public school land survey, was completed for 189 b/d through 16/64-in. choke and perforations at 7,938-58 ft. in the Pennsylvanian. The well is 2 mi. northwest of Penwell field.

In Terrell County, Richardson & Bass No. 1 M. H. Goode, section 6, Block R, TCRR survey, was completed for 60-million cu. ft. of gas per day from the Ellenburger at 13,578-14,803 ft. The discovery is 3 mi. northwest of Brown & Bassett field.

Oklahoma—Phillips Petroleum Co. No. 2 Pearl, section 16-1n-15e, Texas County, was completed for 23.2-million cu. ft. of gas per day and 139 b/d of distillate through perforations at 5,740-72 ft. to open Marmaton production in the center of the company's Hugoton gas area acreage. Nearest production from similar depth is 11 mi. southeast. Usual production is from about 3,000 ft.

Alabama—Magnolia Petroleum Co.-Zach Brooks Drilling Co. No. 1 School, section 16-2n-3w, Mobile County, flowed 54 bbl. of oil per hour through perforations at 11,602-12 ft. The test, 2½ mi. northwest of Citronelle field, was originally drilled to 11,833 ft. and abandoned earlier this year.

North Dakota—Anschutz Drilling Co. No. 1 Feland, section 12-162n-83w, Bottineau County, was completed on the pump for 110 b/d plus 57% water through perforations in the Mission Canyon(Mississippian) at 4,084-88 ft. The well is 3 mi. south of Haas field.

North Texas—The Texas Co. No. 1 John Raymond, W. F. M. Thompson survey, Montague County, was completed for 334 b/d of 38.6-gravity oil through 20/64-in. choke and perforations in the Pennsylvanian at 6,746-49 ft. The well is 1 mi. south of the Trans Caddo field and separated from it by a pinchout.

Nebraska—Petroleum, Inc. No. 1 Maas, section 4-13n-54w, Kimball County, recovered 5,450 ft. of oil and 180 ft. of mud on 105-minute test of the J sand at 6,040-63 ft. The wildcat is 1½ mi. east of Swisher field.

Also in Kimball County, Don Rounds Drilling Co. No. 1 Towle, section 10-15n-53w, recovered 2,730 ft. of gas-cut oil and flowed gas in 22 minutes on 1-hour test of the J sand at 5,563-71 ft. The prospect is 2 mi. west of Anderson field.

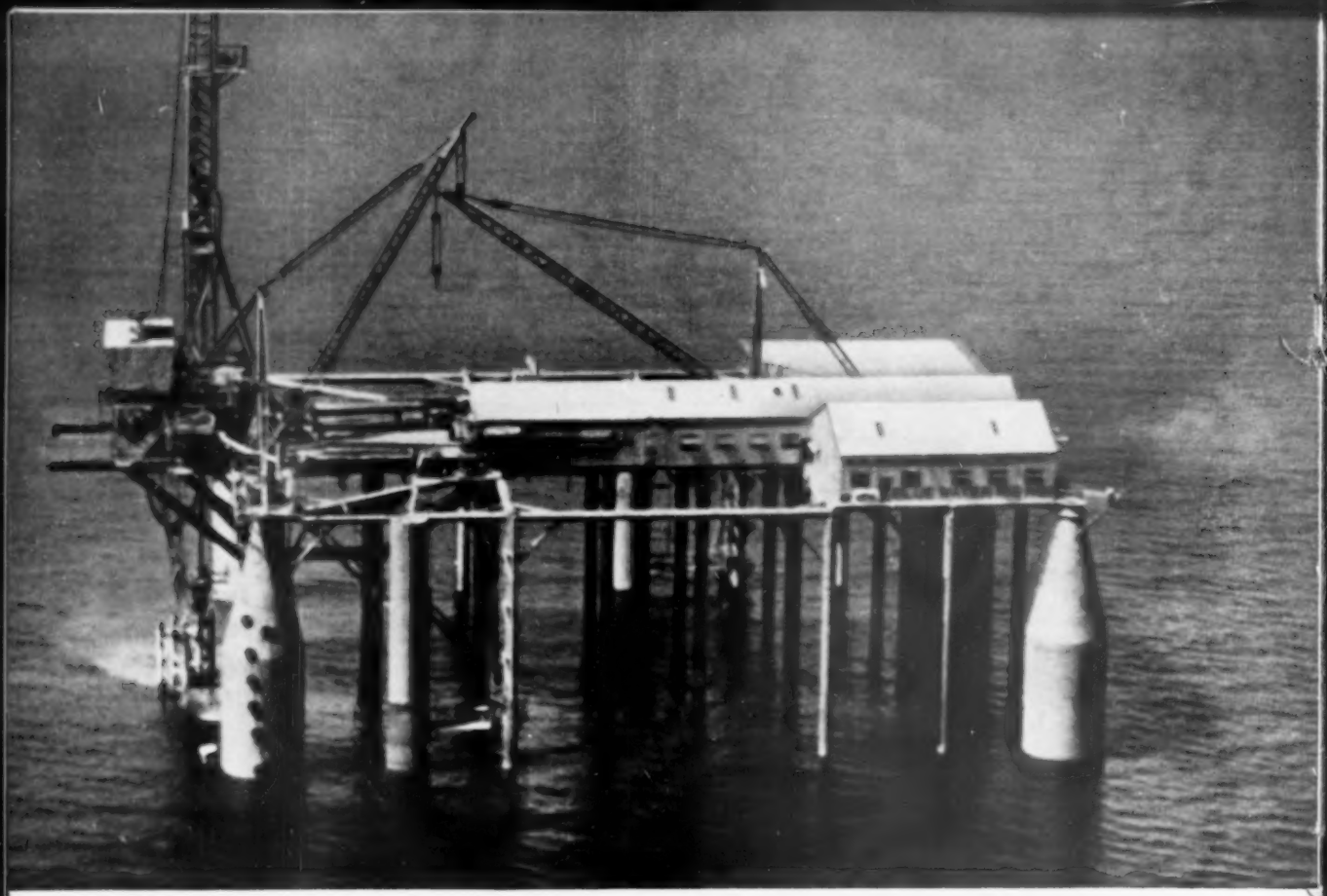
Wyoming—Atlantic Refining Co.-Fremont Petroleum Co. No. 3 O'Brien Springs Unit, section 34-25n-86w, Carbon County, recovered 300 ft. of slightly gas-cut mud on 115-minute test of the Madison at 7,627-827 ft. On two previous tests, oil was recovered from the Tensleep. The project is 10 mi. northwest of Mahoney Dome field.

Texas Panhandle—Sinclair Oil & Gas Co. No. 1 G. F. Buzzard, section 75, block 13, T&NO survey, Ochiltree County, was completed as a Morrow sand discovery, flowing 423 b/d through ¾-in. choke and perforations at 8,337-40 ft. The discovery is 3 mi. east and south of Farnsworth field.

Alberta—Union Oil Co. of California No. 4-20 Red Earth, lsd 4-20-88-8w5, recovered 310 ft. of heavily oil-cut mud and 1,410 ft. of 38.5-gravity oil on test at 4,170-255 ft. in the Slave Point, a new pay for the area. Oil in the Red Earth Creek region has been found previously only in the Granite Wash. The prospect is 6½ mi. north of the initial Granite Wash discovery in the area.

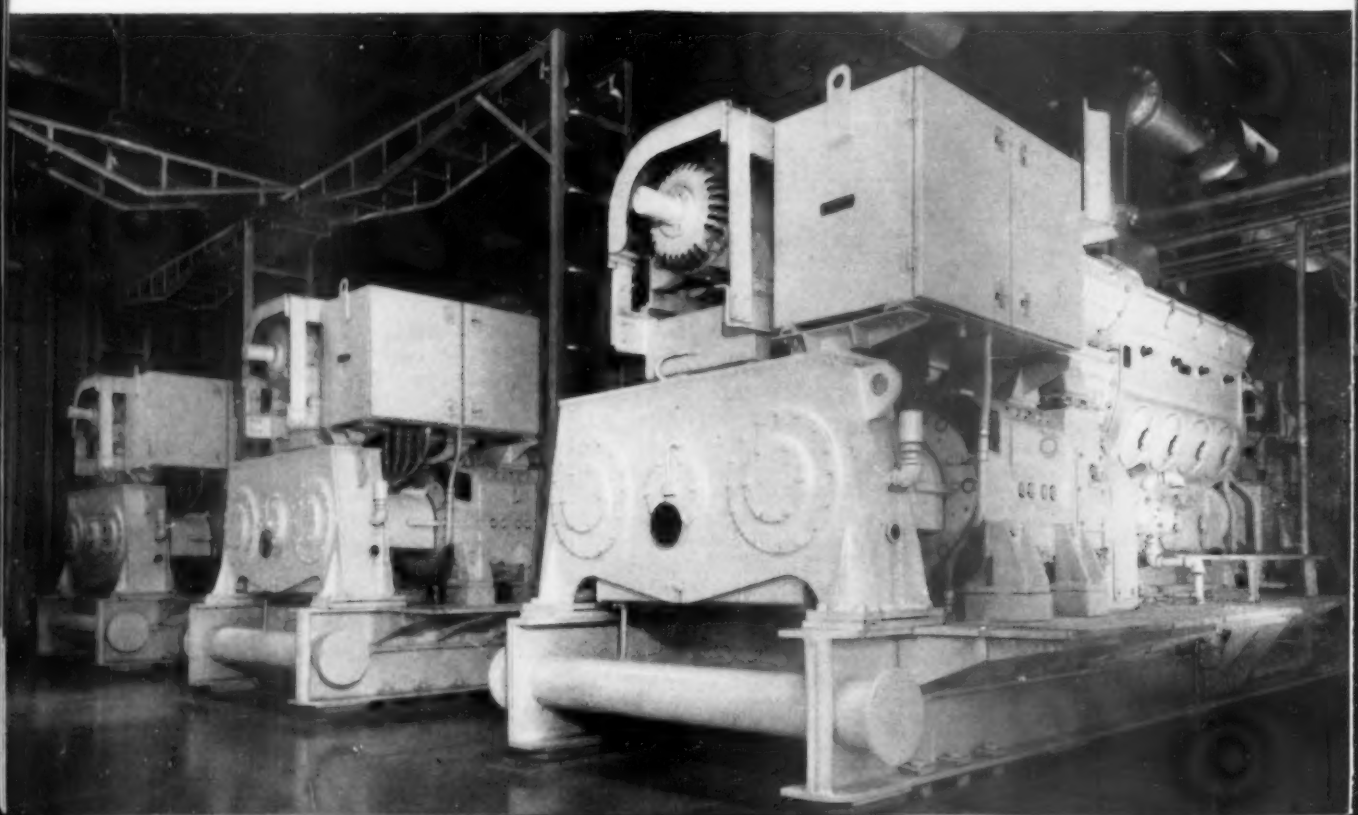
East Texas—Amerada Petroleum Corp.-Wiggins Bros. No. 1 C. C. Graden, Thomas E. Tucker survey, A-366, Marion County, was completed for 89 b/d of oil and 577,000 cu. ft. of gas per day from the Travis Peak at 6,454-67 ft. to open a new pool 6 mi. east of Smithland.

Colorado—The California Co. No. 1 Bales, section 19-39n-14w, Montezuma County, recovered 200 ft. of oil on 4-hour drillstem test at 5,285-341 ft. The project is scheduled to 8,900 ft. to test the Elbert. It is 19 mi. north of Point Lookout field.



Blue Water Rig No. 1 was constructed by Ingalls Shipbuilding Corporation, commissioned in September, 1957. Platform measures 242′ by 202′. Unit can drill in 70′ of water.

Three 900 horsepower Electro-Motive generator sets are shown here in white-painted engine room. Each engine drives two 500 KW generators that supply power to mud pumps, rotary table and draw works.



RIG: Blue Water No. 1

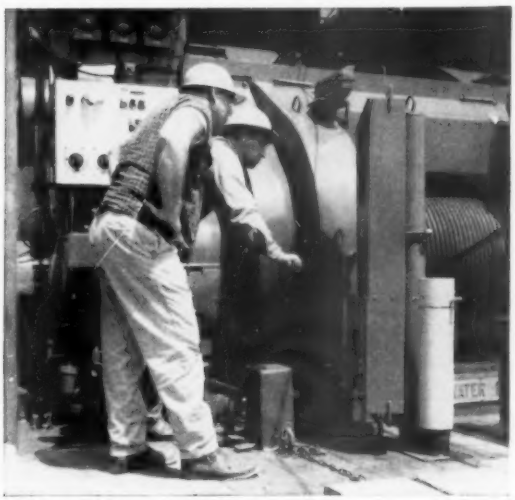
POWER: Electro-Motive

"Dependability" biggest factor in power choice

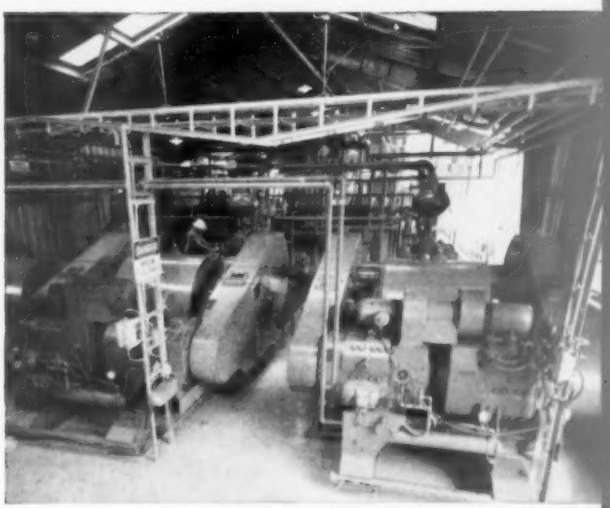
Blue Water Drilling Corporation put Electro-Motive Power in their Rig No. 1 because they knew this equipment had what they wanted: a proven record of performance under all kinds of drilling conditions; smooth, accurate, flexible power control; and only *one* manufacturing responsibility for the complete power system.

Summed up, these reasons mean just one thing—*dependability*. The stakes in offshore or deep land drilling are extremely high. Just as high are the demands on equipment. That's why a drilling company like Blue Water places the power responsibilities of their multi-million dollar rig No. 1 with Electro-Motive Power. In fact, more offshore rigs are powered with Electro-Motive Power than by any other Diesel-electric system.

If you are considering power equipment for deep land or offshore drilling, contact your Electro-Motive representative.



Control center is located beside draw works. Here, Carl Wilson, (left) Toolpusher and L. L. McMillian, Driller, watch weight indicator. Behind them is the Electro-Motive control panel which provides control of all Diesel-electric equipment.



Mud pumps are powered by 625 horsepower Electro-Motive motors. Three pumps are used. Two shown here each have two motors. Third pump has one motor. Draw works is powered by two similar drive motors.

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New Gas Treating Process Is '3-in-1'

A new one-step process to sweeten and dehydrate sulfur-containing gases while simultaneously producing elemental sulfur is claimed by L. S. Reid and F. M. Townsend of the University of Oklahoma.

Called the "Townsend Process," it is based on a chemical reaction mechanism discovered by Townsend. The process has been developed to the pilot plant stage. U.S. and foreign patents are pending. The process has been licensed to Hudson Engineering Corp., of Houston.

Advantages claimed for the new process are that it can replace three conventional gas-treating processes (sweetening, dehydration, and sulfur recovery), and is flexible and economical.

Hundreds of tons of sulfur daily are now vented to the atmosphere in the form of acid gases, because it is not economical to recover less than ten tons a day of sulfur in a single plant, Reid and Townsend told the Rocky Mountain Regional meeting of the Natural Gasoline Assn. of America last week. The Townsend process, they said, overcomes this problem by combining sulfur recovery with gas sweetening and dehydration.

Other features reported for the process are: insensitivity to carbon dioxide in the process gas stream; effective dehydration of the residue gas; easy adaptation to a complete range of hydrogen sulfide concentrations in the process gas stream; sulfur recovery efficiency which may exceed 95%. Also, the process may be designed to replace the Claus process in converting acid gases from amine-type gas treaters.

The basis for the Townsend process is the chemical combination of hydrogen sulfide with sulfur dioxide to form elemental sulfur and water.

This reaction takes place in two steps: (1) A portion of the hydrogen sulfide is oxidized to form sulfur dioxide; and (2) the remaining hydrogen sulfide and the sulfur dioxide are reacted to form sulfur and water.

The reactions are exothermic, giving off a heat of reaction of 56.2 kilocalories with a free energy change of —26 kilocalories at 25C (77F). At temperatures below 730C (1,346F), a catalyst (water) is needed for the reaction.

Equilibrium conversion of hydrogen sulfide to sulfur is about 95% complete in the catalytic range below 300C (572F), and approaches 100% at atmospheric temperature. The reaction rate varies with the temperature in this range.

Increased operating pressure increases equilibrium conversion at any prescribed temperature in the catalytic range (below 730C).

The reaction medium for the Townsend process is a small proportion of water (the catalyst) contained in solution with a hygroscopic organic liquid.

While a large number of hygroscopic organic liquids can be used, triethylene-glycol or diethylene-glycol are preferred, because of low vapor pressure, high hygroscopicity, and thermal stability.

The water content, never over 10%, is usually held at 2% to 5% of the wet glycol solution. Since water is one of the reaction products in the making of sulfur by the Townsend process reactions, its concentration is controlled by controlling the rate of introduction of glycol into the system. The rate of reaction is inversely proportional to the water concentration in the glycol.

The reaction of hydrogen sulfide and sulfur dioxide takes place at the gas-liquid interface.

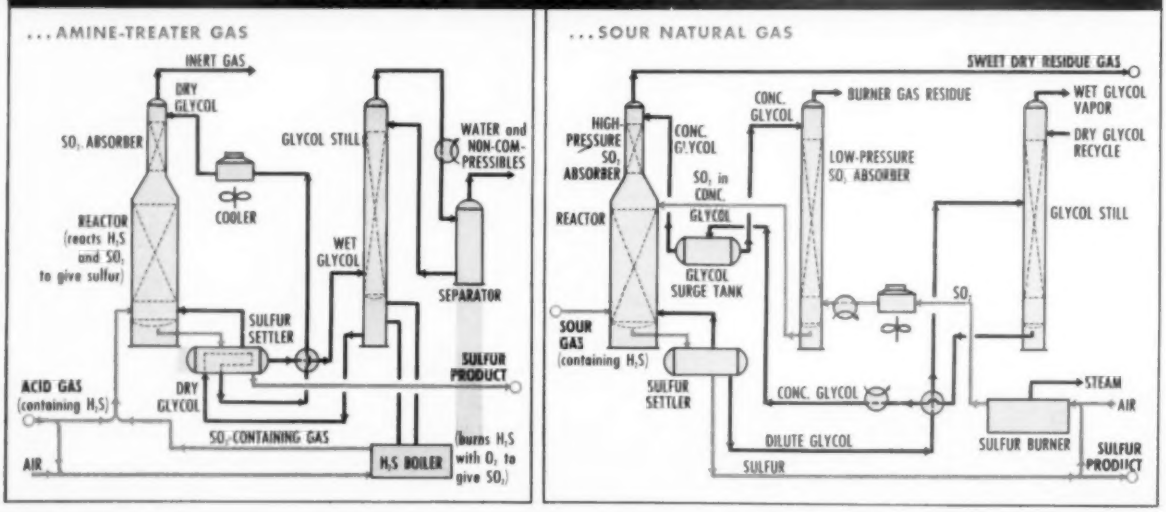
The Townsend process can be used to recover sulfur from acid gas produced as byproduct from an amine-type gas sweetening plant.

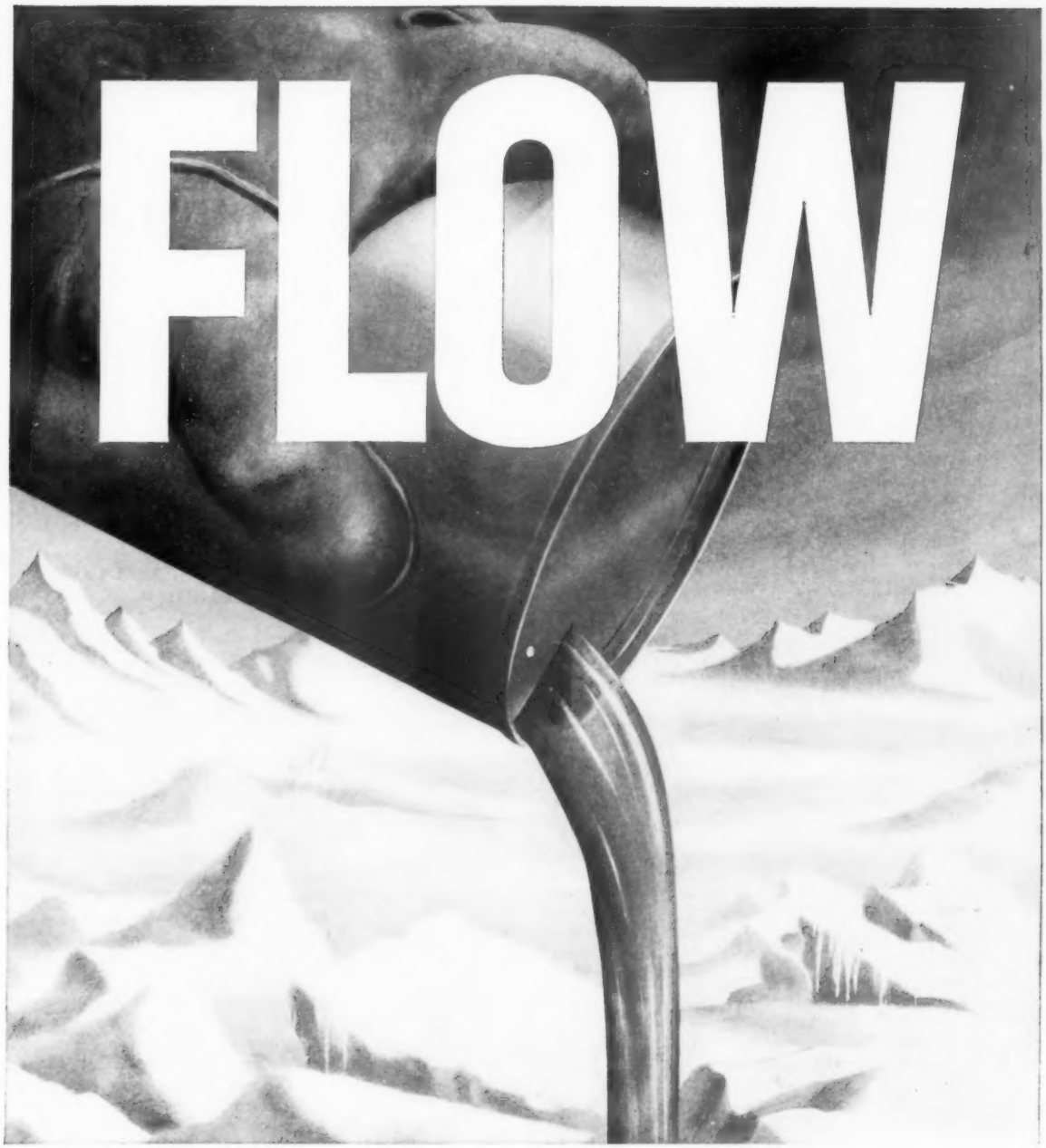
As shown in the lefthand flow diagram (below), the incoming acid gas stream (containing hydrogen sulfide) is split, one-third being mixed with air and burned in a boiler to make the sulfur dioxide needed in the reactor. Sulfur dioxide-containing flue gas from the boiler is cooled to 120F to 130F and mixed with the remaining two-thirds of the incoming acid gas stream.

The mixed gas stream rises through the reactor where it is contacted by a descending 98%-glycol stream (2% water). The hydrogen sulfide and sulfur dioxide react almost instantly.

The sulfur, insoluble in the glycol, forms a slurry, which settles out in the sulfur settler. The water formed

HOW THE TOWNSEND PROCESS REMOVES SULFUR FROM . . .





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in the reaction dissolves in the glycol.

Sulfur is melted in the settler, and withdrawn as product. Glycol from the settler is decanted and sent to the glycol tower to be dehydrated before reentering the top of the absorber at about atmospheric temperature.

A variation of the Townsend process can be used to produce sweet, dehydrated residue gas for pipeline service.

This application of the process, shown in the righthand flow diagram (page 38), obtains the needed sulfur dioxide by combustion of a portion of the sulfur product. The sour stream cannot be oxidized as in the preceding processing scheme because of its hydrocarbon content.

The sulfur dioxide is introduced into the reactor via a glycol stream, instead of being mixed directly with the incoming gas stream. This necessitates an extra absorber column (low-pressure) to absorb sulfur dioxide from the sulfur-burner flue gas.

Concentrated, sulfur-dioxide-free glycol drops through the high-pressure absorber to remove traces of sulfur dioxide from the rising sweetened gas.

The counterflow design of the reactor produces a temperature gradient, which, in turn, enhances efficiency of hydrogen sulfide removal.

The temperature at the base of the reactor is highest, and gives the highest rate of reaction (but not a 100% completion at this temperature). As the unreacted hydrogen sulfide and sulfur dioxide rise to the cooler upper portion of the reactor, the temperature approaches atmospheric and the reaction approaches 100% completion.

When carbon dioxide content of gases exceed pipeline specifications for residue gases, the Townsend process cannot be used by itself.

Carbon dioxide is not removed by the Townsend process. The most economical solution to this problem would appear to be conventional amine-water treatment to remove hydrogen sulfide and reduce carbon dioxide to specifications. The Townsend process could then be used to convert amine-unit hydrogen sulfide into elemental sulfur.

Or, the Townsend process could be used to recover the sulfur prior to the amine-water-dehydration treatments.

The economics of the process appear attractive, according to Reid and Townsend, though economic evaluations are not yet complete.

Based on current costs of equipment and labor, and the current price of sulfur, revenue from sale of sulfur will offset operating costs for the Townsend process whenever the hydrogen sulfide content of the incoming gas ranges from 2% to 3%, or higher.

In addition, as the carbon dioxide concentration of the incoming gas increases above 1%, the unit sweetening cost for the Townsend process is said to be substantially lower than for amine-water treating.

No detailed studies were reported comparing the Townsend process to the Claus process for recovery of sulfur from the acid-gas stream of amine treating plants.

Oil 'Subs' Ready to Play

Processing will be ready to make products from petroleum "substitutes" when it becomes necessary for these "subs" to supplement crude oil on a commercial basis.

That's how it looked this week to a group of experts at the annual meeting of the American Institute of Chemical Engineers. The experts got together to evaluate the progress being made in process-development for the non-crude-oil hydrocarbon energy sources that will some day help petroleum meet its market demands.

They discussed the future of processing coal, shale oil, and gilsonite. Generally, the long-range predictions were optimistic:

In fact, gilsonite, a "sub" that has been processed to produce gasoline and coke in commercial quantities for only a year, already shows promise of becoming a stock for specialty products as well.

American Gilsonite Co. put its Grand Junction (Colo.) refinery on stream just about a year ago (PW—Aug.2'57,p36). The plant has been making about 1,300 b/d of gasoline and 300 b/d of coke since then.

But L. P. Morris, manager of operations at the refinery, told the AICHE meeting that this is by no means the end of the gilsonite product range.

"The company is currently engaged in an active research program, and there appears to be good possibility of branching into the manufacturing of specialty products."

However, Morris also told of "serious corrosion problems" that have cropped up in the gilsonite plant:

In the plant's delayed coking unit, for instance, "selective corrosion believed to be caused by naphthenic acid has occurred at points of high velocity and in a temperature range of 400F in the light gas oil recycle systems," according to Morris.

He said that the metallurgy of the wear rings, sleeves, and spacers of the unit's pumps has been changed to counteract this corrosion.

Hydrogen blistering in the vapor systems of the fractionator and stabilizer, Morris reported, has also been a problem. Heavy injection of filming amine inhibitors into the overhead vapor lines of both columns seems to be reducing this corrosion, he said.

Shale oil is probably still a few years away from being processed commercially. But the processing route has been worked out and, in itself, is not economically prohibitive.

Fred L. Hartley, of Union Oil Co. of California, told the meeting that products from shale oil cannot quite compete in price with those made from crude oil at this time. But he pointed out that processing costs for shale oil are already comparable to those of crude oil.

Union's initial steps in processing shale oil, Hartley said, will bank on coking, and hydrogenation of the coker distillate.

"A commercial shale oil is produced by this procedure," Hartley said, "which can be readily shipped by pipeline, blended with crude oils, and sold as a high-grade crude oil, superior in refining value to most of the world's crude oils."

Coal synthesis as a method of making petroleum products is also "waiting in the wings." A basic change in automobile engines, however, could usher in this kind of processing sooner than many expect.

J. H. Field, H. E. Benson, and R. B. Anderson, all involved in coal-to-oil research for the Bureau of Mines, reported that the bureau still is quite active in exploring the coal-synthesis method of making gasoline and other petroleum products.

The bureau's researchers contended that development of the gas turbine or free-piston engine for widespread use in automobiles would make processors sit up and take another look at coal synthesis. They said that the paraffin oil which is readily obtainable by the Fischer-Tropsch synthesis process, for instance, "with its high heat of combustion, will be attractive" under such circumstances.

L. W. Garrett, Jr., of M. W. Kellogg Co., told the meeting that the Sasol process of converting coal to petroleum products is now being used to produce 3,260 b/d of gasoline, 142 b/d of diesel oil, and small amounts of several specialty products for the South African Coal, Oil & Gas Corp.

PROBLEM:
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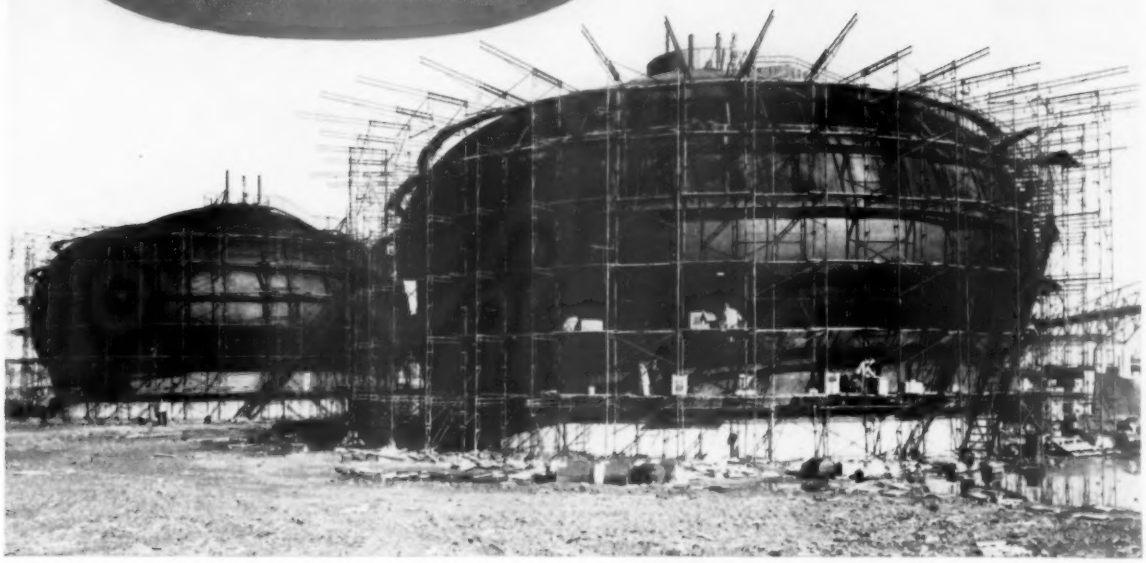

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What's New / IN PROCESSING

Union Oil Co. of California has bought 600 acres of land on the Tulalip Indian Reservation near Everett, Wash., and is negotiating for an additional 1,600 acres as a refinery site.

The 600 acres were bought at a public auction handled by the Bureau of Indian Affairs. Union has been considering a refinery in the area for several years.

•

Celanese Corp. of America has plans to double the capacity of its Pampa (Tex.) acetic acid plant.

New facilities will enable the plant to produce 240-million lb. a year of the acid—15% of the nation's total requirements. Work on the multi-million-dollar expansion will start this year and be completed by late 1959.

•

Esso Research & Engineering Co. reports an "important breakthrough" in the design of hydrocarbon fuel cells.

To date, most fuel cell work has been based on the reaction of hydrogen and oxygen to produce electricity directly (PW—Jun.6'58,p30). But Esso Research announces successful oxidation of ethane gas to produce electric current.

•

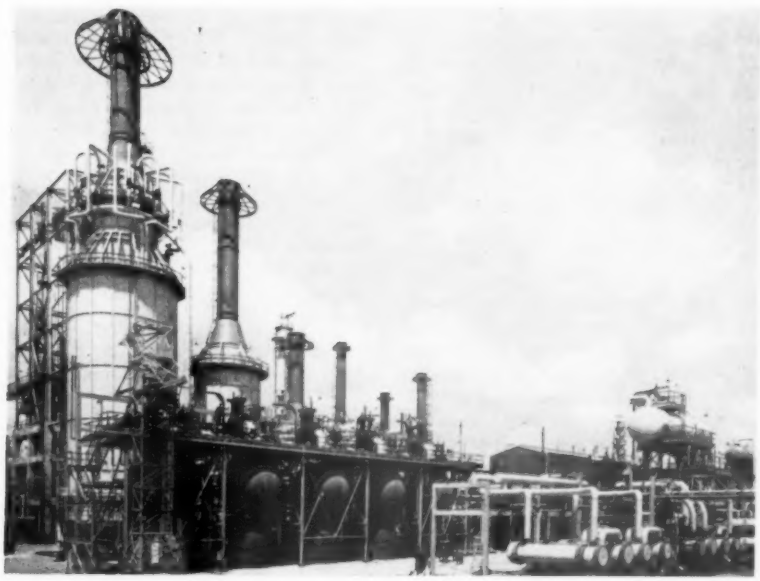
Carter Oil Co. is converting a bauxite desulfurizer into a naphtha distillate Hydrofiner.

Capacity of the Hydrofiner will be 10,275 b/d. The bauxite desulfurizer has a capacity of 9,220 b/d. The Refinery Engineering Co. is handling the job.

•

Anlin Co. will build a sulfur-from-hydrogen sulfide plant adjacent to Shell Oil Co.'s Wood River (Ill.) refinery.

Capacity of the plant will be 150 tons a day of sulfur. Construction will start late in September, and operations are due to start by mid-1959. Cost of the plant will be about $2-million.



Largest Powerformer Goes on Stream

Esso Standard Oil Co. has put a 27,000 b/d Powerformer on stream at its Baton Rouge (La.) refinery. The unit is said to be the largest of 15 Powerformers already built, or under construction, in five countries. A new debutanizer and splitter unit went on stream at the same time to furnish feed stock for the Powerformer, as well as LPG for sale in the Baton Rouge area.

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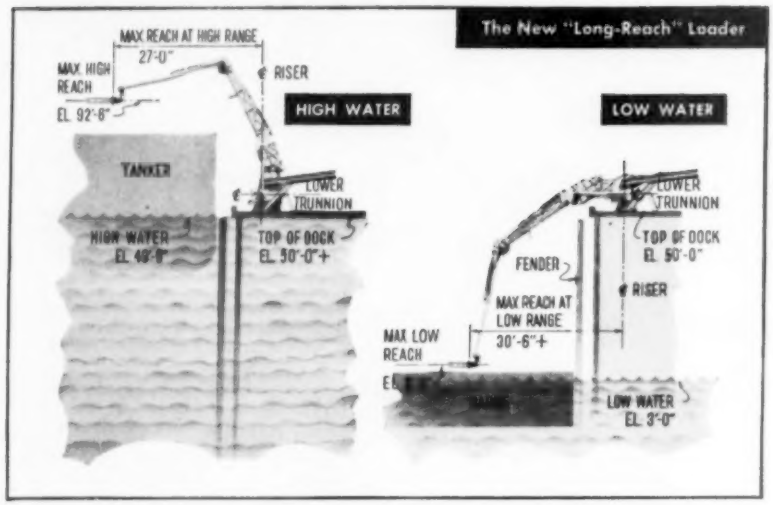

Loading Gets More Flexible

Here's the latest development in the oil industry's swing to faster marine loading systems—a "long-reach" model of the Chiksan loading arm, designed to service a variety of vessels under wide tidal variations.

The new system is manufactured by Chiksan Co., a Brea (Calif.) subsidiary of Food Machinery & Chemical Corp. Chiksan nudged the industry toward faster marine loading systems when it came out with its original system back in 1956 (PW—Jun.22'56,p34).

Under normal operating conditions, the new version of the system is identical in performance range and characteristics to the standard Chiksan system. However, under less-than-normal conditions, special features of the new model come into play to make for highly-flexible loading facility:

Additional motion in the new unit —vertical motion—is made possible by another trunnion at the structure's base (diagram).

Just as in the standard Chiksan system, aluminum arms play a key role. In the standard system, each arm has two sections, articulated with Chiksan swivel joints. The arms are rated for 300 psi. maximum pressure and 225F maximum temperature. They are supported by a hydraulically powered, counterbalanced boom arrangement.

In the new version, Chiksan has added a full-length third section to the standard two-section arm. The additional section on each arm, plus the new trunnion, which serves as a pivot for vertical movement, provide enough flexibility for a 15-ft. to 50-ft. variance in tide levels from low water to high water. This makes it possible to service all barges and tankers in all water stages, whether they are empty or loaded, from the same self-contained unit.

The loading unit adjusts for all movement, whether vertical, horizontal, or longitudinal.

Another major difference between the new "long reach" model and the standard system is the elimination of the deadweight counterweight and incorporation of a hydraulic deadweight accumulator. This serves to lighten the strain on dock structures.

The "long-reach" model was designed as an answer to the loading problems that faced Esso Standard Oil Co. at its Baton Rouge (La.) terminal. Because the terminal is located at the mouth of the Mississippi River, loading operations must be carried on there while tidal extremes as well as changes in the river level take place.

So a mighty flexible loading system was needed.

The new system, designed for special loading conditions, will be in addition to the standard Chiksan marine loading system.

The first of the standard systems was installed in May, 1956, at Richfield Oil Corp.'s terminal No. 2, at Long Beach, Calif.

Since then, 100 Chiksan marine loading arms have gone into service throughout the world.

In addition to the 18 in service at Long Beach, 60 are operating on Lake Maracaibo, Venezuela; 18 at Philadelphia; and others in Sumatra.

Others have been ordered by Kuwait Oil Co., Ltd., Arabian American Oil Co., Shell Oil Co., Union Oil Co. of California, and Esso.

The main advantage of the Chiksan system is that it has proven to be both fast and safe.

One operator's experience with the system can be summarized this way:

Since installation of the first bank at its terminal, the company has handled over 50-million bbl. of crude and various products in loading tankers from T-2s on up to 46,000-tonners—all without spills or back injuries due to loading or unloading operations.

Chiksan marine loading arms handled about 90% of the volume at this particular terminal.

Savings in safety and efficiency, the company has found, are giving a much faster payout on the Chiksan systems than originally expected.

The safety angle may pay off quite tangibly too: Because of the system's outstanding safety record, it may result in favorable consideration by the underwriters in negotiating insurance contracts.

In addition, such systems have permitted redeployment of terminal men and tanker crews to other dockside functions during loading and unloading.

Compared with the six or seven men necessary to handle a rubber hose, it takes only one man at the controls of the new loader, plus two men on the tanker deck, to make a hookup.

Recently, for instance, five hookups were made in 11 minutes at one terminal where a Chiksan system is in use. With older loading methods this number of hookups took up to 1½ hrs.

An important factor in the success of one Chiksan loading system is its extensive manifolding worked out behind the loading arms.

The design enables the company using this installation to change products behind the loading arms by changes in the manifolding. The company handles more than 30 petroleum liquids through this system's five 8-in. arms.

The operator on the installation is positioned in a pulpit-like booth beside the loading arms. Controls are simple—levers to choose the arm, to control the boom, to control the "hose," and to control horizontal motion.

Computers Get More Work

Electronic computations are saving pipeliners many man-hours in working out all kinds of planning and operating problems. Look for this saving to grow steadily.

There's a more important role on the way for electronic computers in helping to plan and operate both natural gas and oil pipelines.

"Medium-sized" electronic digital computers—such as IBM's model 650—have been getting increasing use by pipeliners in recent months. This week, a group of such users told how the computers are being used today to solve pipeline problems—and what pipeline problems they'll be asked to deal with in the months and years ahead.

The reports and forecasts were made at the annual meeting of the American Society of Mechanical Engineers, at Denver.

The operation and maintenance of gas line compressor stations is coming to rely much more heavily on the answers such computers come up with.

Tennessee Gas Transmission Co. has been using such computers to effect better control of the performance and maintenance of over 500 compressor engines on its gas transmission system.

TGT's John Manry III told ASME, "The big plus factor of electronic computer reports has been to increase greatly our knowledge of the operation and maintenance of compressor equipment. Information that was previously obtained by sampling is now processed on a daily basis."

TGT has used computers to speed, and to make more accurate, calculations on daily compressor reports, monthly station efficiency reports, and engine repair and downtime reports.

But Manry suggested that such calculations may be only the beginning:

"There exist many possibilities for the future operations of the electronic computer reports. Some day answers may be found for determination of the most efficient combination for engines to run at a given station location; and determination of the optimum loading conditions for a group of stations on a pipeline."

The recent design analysis of a natural gas gathering system by a computer was called "a long step" toward the ultimate use of computers on gas lines—design analysis of the whole system.

L. R. Henry and R. B. Peritz, of Colorado Interstate Gas Co., describing their company's experience with computers, told the meeting that "the use of the high speed digital computer in solving this problem has now been proven practical . . ."

Moreover, they said, "by means of this machine evaluation, the designer can evaluate more variations, and therefore can usually provide a more economic design."

"The application of machine computing techniques to the analysis of a gathering system," the CI representatives said, "is a long step toward the machine analysis of an entire natural gas system from well to consumer."

Computers are already providing a more complete examination of the economic feasibility of proposed crude lines.

T. R. Young, Shell Pipe Line Corp. engineer, said that his company has used electronic computers "in economic studies of three major [pipeline] construction projects with total valuation approximating $80-million."

At Shell Pipe Line, each of these studies has included the basic design of the line, estimation of the capital and annual operating costs for the system, and computation of critical financial data for the project.

Shell's conclusion, according to Young: "Benefits achieved with automatic computation include proof that simulation of pipeline operations is practical. . . . The computer has facilitated extension of economic analysis to (a) year-by-year treatment for greater accuracy, and (b) additional criteria for investment decision."

But even the computer specialists admit that electronic tools won't be able to take away management's responsibility for the final decision on any given project.

Young put it this way: "It should be recognized that the computation work reported here is only part of the whole process of investment analysis. Much work in such analysis lies outside the domain of electronic computation.

"Basic decisions regarding estimate of crude reserves, pipeline route, and design and construction practice must be made by engineering scrutiny of the over-all problem. . . Output data from the various computer programs are subject to final interpretation by the economist."

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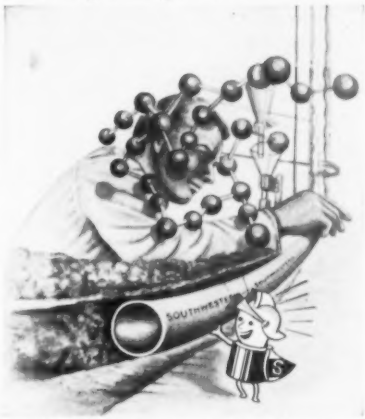

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SWP-1

What's New / IN TRANSPORTATION

A new type of deep groundbed for cathodic protection of pipe in high-resistivity soil received a solid recommendation this week from the company that has experimented with it, Interstate Oil Pipe Line Co.

IOPL engineer Robert L. Bullock told this week's meeting of the American Society of Mechanical Engineers that his company has recently completed its tests with deep groundbeds of graphite rods and coke breeze backfill (PW—Apr.11'58,p60).

Bullock gave these as the advantages of the new deep groundbeds: more economic protection of bare pipe in highly resistant soil; extensive coverage; little or no interference from foreign structures; and more constant resistance to corrosion despite seasonal changes.

•

Crude movement through the Texas-New Mexico pipeline from the Four Corners area has been averaging about 70,000 b/d during September.

The Texas Co. has been moving a good part of this total—about 32,500 b/d. Other companies moving crude to the line's Jal (N. M.) terminal are Shell Oil Co., 20,000 b/d; Continental Oil Co., 8,500 b/d; Phillips Petroleum Co., 5,000 b/d; Carter Oil Co., 4,000 b/d; and Pure Oil Co., Sun Oil Co., and Ohio Oil Co., a combined total of 1,200 b/d.

•

A new concept in handling legislative problems is being developed by the transportation industry, according to J. L. Burke, president of Service Pipe Line Co.

Burke said last week that the recent repeal of the taxes on transportation "stands out in itself as an example of what can be accomplished when carriers, users, and investors get together and work for a common goal."

•

Interstate Oil Pipe Line Co. will extend its Mississippi crude trunk line to the Raleigh, Martinville, and Magee fields, in Simpson and Smith Counties.

The 35-mi. extension will connect with Interstate's system near Gwinville. It is expected to be in operation by the end of the year.

•

Underground storage of LPG continues to spread: Excavation has just begun on the first such facility in Saskatchewan.

Three underground caverns, with a combined storage capacity of 14-million gal. of propane and butane, are being excavated near Melville, in the eastern part of the province. When they're completed late this fall, the caverns will hold LPG from the casinghead gas processing plant now being built nearby by Steelman Gas, Ltd.

Pressure in the caverns will be maintained by running a saturated salt solution in as the propane or butane is removed.

•

The keel is being laid for the largest ship ever built at Sun Shipbuilding & Dry Dock Co., a 47,750-ton tanker for Sun Oil Co. The $13-million ship, which will have a cargo capacity of about 372,300 bbl., is expected to be completed by early 1960.

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Syria Shapes New Oil Policy

DAMASCUS—A new oil policy for Syria is now being drawn up here, it was disclosed by Akram Hurani, vice-president of the United Arab Republic in charge of the Syrian province.

The Executive Council for Syria will study applications for new oil rights from "several" companies after it has approved the policy lines being drawn up by a ministerial economic committee, Hurani said.

He did not identify the companies involved. Industry sources are not aware of any applications pending, other than one to convert from exploration to development by Menhall Prospecting & Exploitation Co., holder of permits in which Atlantic Refining Co. has nearly one-half interest. (Portsmouth Steel also has a small stake in them.) The only other present permitholder in Syria is Deutsche Erdoel's Concordia.

Atlantic has indicated interest in getting permits on its own, in addition to its share in the Menhall exploration rights, but it has never actually applied for acreage.

It is not clear whether this may mean a reversal in the UAR's plans for government exploration in Syria with Soviet aid—outside the present Menhall and Concordia holdings (PW—Apr.25'58,p64).

Last year, before joining the UAR, Syria concluded a general economic agreement with the Soviet Union that provided for oil exploration and drilling aid. This has not been specifically implemented to date.

In Damascus, oil men are being given the impression something will yet come of the Soviet oil aid pact. In Cairo, they are being given the reverse impression.

Meanwhile, Yugoslav and Czech state concerns have offered to develop the Menhall-Atlantic Karatchok field for the UAR government, official sources have disclosed.

For the time being, Atlantic Refining's efforts to get development rights in behalf of the Menhall exploration operation at Karatchok are frozen.

Atlantic's representatives have returned to the U.S., after weeks of discussions with oil officials in Damascus and Cairo.

J. W. Menhall, U.S. drilling contractor of Syrian origin, had himself been unsuccessful in obtaining the concession, in spite of his early high hopes.

Operations are now suspended in the Karatchok area, in northeast Syria near the Iraq border, where Menhall found oil in four of the five tests drilled in the past two years.

Faced with uncertainties over the outcome, Menhall has indicated he will "Arabize" his firm to get the Karatchok development concession.

Menhall said he would seek Arab capital from the UAR, the new Iraqi republic, Kuwait, and other Arab states; form an "Arab board of directors" from the shareholders; and rename his firm "The United Arab Oil Co."

The format is now being drawn up by legal experts, he said, to be presented for approval by the Syrian Ministry for Trade & Economy.

Atlantic's interest in the permits would not be affected by the "Arabization," since it holds no interest in any of the Menhall companies. Thus, its agreement for an interest in the permits would be unaffected by any corporate change in the Menhall firms.

Creole Builds Giant Crude Tanks

Five giant crude storage tanks, each with 268,000-bbl. capacity, are being built by Creole Petroleum Corp. at its La Salina base on Lake Maracaibo, Venezuela.

The tanks, 200 ft. in diameter and 46 ft. high, will have floating roofs of double plate, with special seals to prevent the escape of gas. Two of the tanks will be in the storage yard, three on the new terminal's platform.

Fight Change in Bolivian Oil Code

LA PAZ—A leftist move to establish legislative control over foreign oil investment is being opposed in the Senate as "perilous" to future oil development by right-wing leader Dr. Federico Alvarez Plata, Vice-President of Bolivia.

"Foreign capital needs guarantees—not bottlenecks," the official said, as debate started on the first of several proposals that the left wing of the government party is expected to make to amend the Oil Code.

This one would give power of approval to the legislature (instead of the executive) on development contracts with foreign companies in the zone reserved for the government oil company (PW—Sep.19'58,p82). There are two such contracts at present: one with Gulf Oil Corp., the other with the T.U.L.M. group of companies.

In other zones, open to direct concession, exploration interests are held by a dozen companies, all but one (Shell) from the U.S.

What's New / AROUND THE WORLD

SWITZERLAND—British Petroleum may wind up with a contract for exploration instead of its own concession, in the Canton of Fribourg.

The Canton bowed to the Federal Council's opposition to foreign-controlled companies by dropping its original plan to grant BP a concession. Instead, the Canton will now grant a 463-sq. mi. concession to S.A. d'Interets, Minier, a new, wholly-Swiss firm set up for the purpose. The company plans to contract actual exploration work to BP.

•

ARGENTINA—A five-year credit offer for up to $140-million worth of oil development equipment has been accepted from a five-company British group.

Argentina's Minister of Economics last week signed an agreement providing for repayment as follows: 5% on placing orders; 15% when equipment is shipped; the remaining 80% semiannually over a five-year period. The companies involved: Henry Balfour & Co. Ltd., General Electric Co. Ltd., Mitchell Engineering Group Ltd., William Press & Son Ltd., and Peterson Engineering Co. Ltd.

•

MEXICO—Dissidents won control of two oil union locals last week, cracking the alignment of oil union leadership with the government for the first time.

The dissident faction swept into control of two Federal District locals in special elections after a nationwide oil strike was threatened (PW—Sep. 12'58,p54). The basic issue: objection to a hold-the-line wage policy announced earlier by national oil union officials.

•

SAHARA—Phillips Petroleum and Canadian Delhi Oil last week released details of their participation in the latest Sahara grants made by the French government (PW—Sep. 12'58,p13).

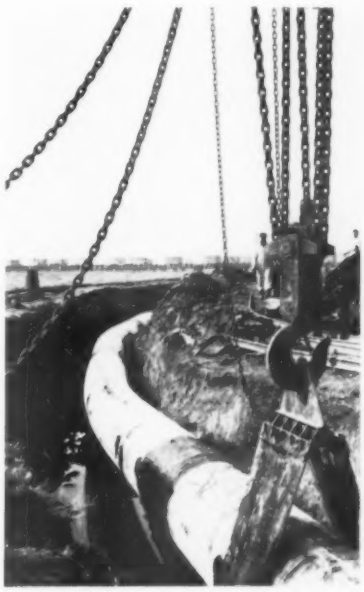
Phillips will have 49% interest and serve as operator on the 1,748,260-acre El Atchane permit, one of two new tracts it won with French partners. On the other, the 1,433,203-acre Beressof permit, Phillips has 25%, and the operator is Copefa.

Canadian Delhi Oil said Franco Delhi S.A., its French subsidiary, will hold 30% and serve as operator on the 445,000-acre Daiet el Habs permit. The other shares: E. Constantin Jr., 6%; Allen & Co., 7%; Vaughn Brothers' Trusts, 3%; Home Oil Co. Ltd., 3%; Petropar, 35%; and Francarep, 16%.

•

UNITED ARAB REPUBLIC—Possibilities of setting up petrochemical industries in Egypt are now being weighed by the General Petroleum Organization, Egypt's top oil authority.

According to the official Middle East News Agency, GPO has set up three technical committees to study possible production of detergents, plastics, and synthetic rubber, and the industrial use of natural gas that is now being flared in the new Sinai oil fields.



Start 190-Mi. Line

Dutch and German contractors have started laying the 24-in. pipe for the 190-mi. Rotterdam-Ruhr pipeline. The job will be completed by mid-1960 for a group including Royal Dutch Shell, Socony, and Caltex.

Various anticorrosion wrappings are being applied to the pipe on the spot. Welding is being done along the route, with additional cathodic protection. The line will have a 2-ft. ground cover throughout its length.

•

GUATEMALA—Another foreign oil exploration move—into Guatemala—is in the wind for Plymouth Oil Co.

Walter S. Hallanan, president, confirmed that Plymouth is now negotiating for Guatemalan oil rights. Plymouth's first move outside of North America was to Africa's Ivory Coast, where the initial exploratory test is now under way in a joint venture with a French company (page 16).

•

UNITED KINGDOM—Ideco mud pumps are now being produced in England for export to sterling areas by Pulsometer Engineering Co. Ltd. under a licensing agreement announced by Ideco, Inc., in Dallas last week.

Complete Ideco rigs have been manufactured in England since 1952 by another licensee.

•

VENEZUELA—Creole Petroleum's Quiriquire Field, in eastern Venezuela, has passed the 500-million-bbl. mark after 30 years of uninterrupted production.

Creole has drilled 640 wells in the field since it brought in the No. 1 discovery well in June, 1928. Before the field was brought in, Creole had invested $16-million in eastern Venezuela without positive results.

•

INDIA—The Russians have struck oil at 5,688 ft. on their first test for the government, according to K. D. Malaviya, India's Minister of Natural Resources. It will take another three months to evaluate the commercial potential of the well, Malaviya indicated.

The Russians started drilling at Vunek Tin Point, Cambay, North Bombay state, in late July, using a Yalmash 3-D turbodrill.

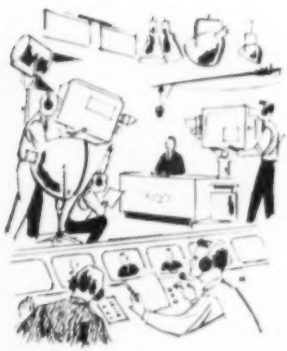
•

AUSTRALIA—The state government of Queensland is considering removal of the limit on exploration acreage a company can hold in an effort to stimulate foreign interest.

The new legislation would divide Queensland into three zones, with no limit on the number of permits. At present, a company can only hold a total of five.

Like your Television Set...

there's more to Cities Service than meets the eye!



Behind the performers on even the simplest television show is at least one writer, producer, director, camera crew, prop man and engineer—to say nothing of the fantastic network of electronic equipment that transmits their efforts to you.

The newscaster who brings a summary of the day's events appears alone on this screen, but behind him—unseen by the TV audience—are thousands of men and women who made his program possible. They include the people who designed and built the facilities of TV transmission, cameramen, technicians, script writers, directors, producers, newsmen throughout the world, and many others.

Producing gasolene is like that. To provide the motor fuel which flows from pump to car requires a host of people who must find and produce the crude oil, refine it, test it in laboratories, transport it to distributing points, and finally deliver it to the station tanks to await the customer's order to "fill 'er up."

In the case of Cities Service, one of the nation's leading oil companies, all this required a capital investment of more than $179,000,000 in 1957 alone. It is money well invested, for petroleum products are vital to modern living—second only in importance to food itself.

CITIES SERVICE

DEPT/Marketing

Use of Operations Research Grows

Oil companies are stepping up the use of operations research to guide marketing decisions. Sun's application of this tool to custom blending and other marketing moves is one more sign of the trend.

Sun Oil Co.'s use of operations research (OR) in choosing custom blending over other systems of gasoline marketing underscores today's growing acceptance of this tool by oil management.

James S. Cross, manager of Sun's statistical research department, described the custom blending study as "the most ambitious operations research effort undertaken by Sun," when he spoke in a roundtable session of the National Industrial Conference Board meeting in New York last week.

In general, OR's scientific application of such things as higher statistical and mathematical theories, linear programming, input-output, quadratic equations, theory of games, and other techniques is now helping the managements of most big oil companies to make decisions. Some majors are considerably more active than Sun.

Once Sun decided to abandon its single-grade marketing system, an operations research task force went to work—gathering and evaluating data for nearly three years.

The task force was composed of social and physical scientists and operating and administrative personnel, all Sun employees. The attention of the group initially was focused on the engineering aspects of custom blending. The team went after the answers to two technical questions: (1) Could an octane concentrate be produced in sufficient quantity and within realistic cost? and (2) Could a pump be developed that would effectively blend the two basic components?

A separate subgroup tackled each of these technical questions. Electronic computers were used to simulate refinery operations, thus aiding the task force in its economic evaluation of optimum conditions for producing the octane concentrate.

During this study of the technical aspects of custom blending, only top management knew of the project, which was referred to as "Operation Kickapoo." The need for actual market data dictated Sun's introduction of custom blending in its Southeastern region, before a final decision could be made.

Operations research transformed masses of data into a decision yardstick for management: a range of profit possibilities for custom blending, for two grades, and for three grades.

The task force constructed a mathematical model to evaluate the rate of return on investment for a given sales volume for each marketing system. The objective was to find out at what volume for each system the added revenue would: (1) equal additional costs, and (2) yield 10%, 15%, or 20% profit before taxes.

Costs, investment, and revenue for each system were compared with dollar sales that would have been generated by the traditional single-grade system as it would have been operated in the reference year, 1958. Only the "incremental" amounts were reported.

Various marketing and manufacturing estimates were substituted in the model to determine the effect of different sets of operating conditions.

To illustrate this technique, Cross cited two separate computations for a two-fuel system: one assuming a 3¢ retail differential; the other, a 4¢ differential.

"We calculated the expected results of a three-fuel system using varying proportions of each grade," said Cross. "For custom blending, we made profitability estimates over a range of octane-concentrate ratios.

"The task group did not specify an optimum solution, but rather presented management with the return on investment for each alternative under a variety of sales volumes and sets of operating conditions. The selection of the most profitable system was thus left to top management."

Sun also uses operations research for other marketing decisions. One example: Selecting the "optimum" site for a terminal to supply 91 retail outlets in Michigan. Cost of the program: the work of three men for two months.

A mathematical model was constructed to represent the cost of supplying the stations from any possible location. This was done by measuring mileage, weighted by potential gallonage, from each station to each possible terminal site. A system of grid squares was superimposed over a map of the areas to be studied.

Two other problems currently under study by task forces: customer delays at stations, and improving sales forecasting methods.

One task force is seeking to determine the optimum number of service channels that should be provided in any given station to get maximum return on equipment and labor—without delaying customers.

Sun has always had its district managers forecast Blue Sunoco sales for three months ahead and send these estimates to the division manager, who forwards them to headquarters.

"There are advantages and disadvantages to having the district manager forecast sales," says Cross, "but we feel that operations research may be able to improve our forecasts, if we can devise the proper formula."

Unlike some other companies, Sun does not have a special staff for operations research, and rarely uses outside consultants.

When management has a problem that calls for operations research, it picks a chairman or task force from the statistical research department, engineering staffs, mathematical programming staff, or market research.

"It's not that we disfavor consultants," says Cross, "but we feel we have to learn this work anyway. Operations research is not a specialty, but a tool that everyone should use."

Sun also distinguishes between operations research and the use of electronic computers. A computer isn't always used for operations research.

"Where it's possible to substitute an IBM 650 for man-hours, we do," says Cross. "For instance, we can calculate gasoline potential, running the program through a 650 with little or no hitch. This job takes one hour of machine time, at an approximate cost of $33, compared to six man-weeks of clerical time, costing us $588. The net saving is $555.

"But if you were to ask me about man-hours saved through operations research, I'd have to say we didn't save any. We actually use more."

On jobs requiring only one calculation, Sun doesn't use the computer, as a rule. This was the case, for example, on many of the marketing calculations for the custom blending program.

API Probes Cause of Dealer Turnover

Low volumes and lack of experience were the leading causes of dealer turnover in the first half of 1958, according to a preliminary report on a survey of nearly 85,000 lessee-operated stations, reports the American Petroleum Institute.

The API Marketing Division's service station advisory committee is sponsoring the survey in an attempt to help solve the continuing problem of dealer turnover.

The survey will eventually cover all of 1958 and 1959.

The preliminary figures should be viewed only as an interim report, cautions API. And, because of seasonal variation and other factors, the first six months' figures should not be projected on an annual basis.

Only lessee dealer stations are included in the survey. But more than 75% of such stations in the U.S. are represented in the preliminary report, according to API.

Ultimately, findings will cover 42 oil companies, which supply about 90% of lessee-operated stations in the U.S. The study is being conducted by an independent research and consulting firm, Industrial Relations Counselors Service, Inc.

The heaviest rate of dealer turnover seemed to occur in stations doing less than 100,000 gal. of gasoline business per year. Such stations showed a dealer turnover rate of 20%.

By comparison, stations with an annual volume of 100,000 gal. to 200,000 gal. had a turnover rate of only 12%. Top gallonage stations—those doing more than 200,000 gal. —reported turnover of less than 7%.

A summary of the survey, released with the figures, notes:

"A station-by-station analysis would be necessary to determine whether low gasoline volume was the cause of the terminations (among smaller-volume outlets), or whether failure to exploit the full potential of the outlet was the principal cause. Included among the low-volume stations are seasonal highway and resort stations, which have a high volume for several months and are not normally operated on a year-round basis."

Relatively new dealers are most vulnerable. Half of the dealers who left their stations during the six months covered by the interim report had been in business less than a year. About one-fourth of these had less than six months' experience as dealers.

About one-fourth of the turnover reported in the first half of 1958 was beyond the control of the dealer or his supplier.

Dealer turnover among the nearly 85,000 stations surveyed was 12.9%. Of this, about 3.2% was attributed to reasons such as highway changes, property condemnation, death, serious illness—or other circumstances beyond dealer or supplier control.

Turnover attributed to "all other reasons" amounted to 9.7%.

Turnover at the smaller, no-bay and one-bay stations was lower than at larger multibay stations.

Turnover, by number of bays, was reported: 11.1% of 5,468 no-bay stations; 12.7% of 12,668 one-bay stations; and 13.1% of 66,181 two-or-more-bay stations.

What's New / IN MARKETING

New 'Tailored Pricing' Predicted by Jordan

Fixed margins will eventually be replaced by "tailored pricing," according to a prediction by J. G. Jordan, marketing vice-president of Shell Oil Co., before the Florida Petroleum Marketers Assn.

Jordan called for a study that would fit pricing to the type of service and class of trade—on the basis of new methods and costs of distribution.

"Protected margins have led to disturbances more than any situation in the country," said Jordan.

Referring to local acceptance as a big factor in pricing, Jordan said that in some areas, independents have the "position" of majors, and, in others, majors have the position of independents.

Jordan also predicted that gasoline taxes may rise to 15¢ per gal. in the next five years, at the present rate of increase and pressures for higher taxes.

•

Socony Mobil Oil Co.'s survey of its "very successful dealers" reveals that these men spend most of their time on the pump island, reports George D. McDaniel, manager of dealer-distributor relations.

The company surveyed dealers with 2 to 14 employees, 350,000 to 900,000 gal. annual volume, and incomes ranging from $9,000 to $25,000 a year. Other highlights of the findings, announced last week by McDaniel:

- The dealers consider themselves primarily salesmen.
- Most of the dealers surveyed do not spend time on lube jobs or book work, in order to spend more time on the driveway.
- They choose employees carefully, train them, have low turnover among help.
- None had worked for other successful dealers.
- They did not think any of their present employees would be good dealers.

•

Testimony of competing suppliers has been ruled out in a Federal Trade Commission hearing on complaints against Socony Mobil Oil Co.'s solicitation of auto dealer lube customers. FTC Examiner Robert L. Piper ruled last week that testimony offered by Socony's competing distributors as to "alleged inducements offered to auto-dealer customers" would not be left in the record as evidence. The testimony would be recorded only as "offer of proof" on the government's part, he ruled.

Additional hearings are scheduled for October in Providence, Boston, and Rochester, and for Dec. 1 in Washington, D.C.

•

World motor vehicle registrations increased about 5½% during 1957, according to a Commerce Dept. report.

Total world registration of passenger cars, trucks, and buses was 108,012,260, as of Jan. 1, 1958, up from 102,289,385 a year earlier. An important factor was the sharp increase in European-manufactured small cars, according to the report.

The U.S. has 62% of total vehicle registrations, but the increase in this country last year was less than 3%. Breakdown on U.S. registration: passenger cars, 55,906,195; trucks, 10,960,814; buses, 268,537.

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these Debentures. The offer is made only by the Prospectus.

$200,000,000

Standard Oil Company

(an Indiana corporation)

4½% Debentures, due October 1, 1983

Dated October 1, 1958 *Due October 1, 1983*

Interest payable April 1 and October 1 in Chicago or in New York City

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Price 99% and Accrued Interest

Copies of the Prospectus may be obtained in any State from only such of the undersigned as may legally offer these Debentures in compliance with the securities laws of such State.

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SMITH, BARNEY & CO. ***STONE & WEBSTER SECURITIES CORPORATION***

WHITE, WELD & CO. ***DEAN WITTER & CO.***

September 18, 1958.

DEPT/Personals

C. D. Rogers

R. W. Hofsess

CLINT D. ROGERS has become vice-president in charge of the new transmission division, and **RUSSEL W. HOFSESS** vice-president in charge of the new production and supply division, of Cities Service Gas Co., Oklahoma City. **John L. Gere,** chief engineer, has been named to head the engineering and research division. The three new divisions were created when the operating division was realigned. Rogers, in the operating division since 1940, was named manager of transmission in 1953. Hofsess, manager of production and supply since 1953, is also vice-president and a director of Cities Service Producing Co. Gere, with Cities Service since 1927, was named chief engineer in 1953. The three men are also directors of the company.

GUY B. HUNTER, chairman of Quaker State Oil Refining Corp., Oil City, Pa., was elected president of the National Petroleum Assn. for a third term, at the association's recent meeting at Atlantic City. **Rexford S. Blazer,** Ashland Oil & Refining Corp., Ashland, Ky., is the new first vice-president, and **John E. Selden,** Pennzoil division, South Penn Oil Co., Oil City, Pa., is second vice-president.

MILTON A. DIXON was named manager of railway sales for Standard Oil Co. (Indiana), at the company's general offices in Chicago. Dixon, assistant manager of railway sales since last October, replaces **George K. Squier,** who is retiring.

WILLIAM J. HUBER will head the Western Rivers branch of Esso Standard Oil Co.'s inland waterways department from offices at Baton Rouge, La. He replaces **Harold S. Young,** who will retire on Oct. 1. Huber has been assistant manager of the New York-New England branch of the inland waterways department since 1951.

FORREST S. WARREN has become vice-president of Texas Natural Gasoline Corp., Tulsa. Warren joined Texas Natural Gasoline in 1954 as sales representative and was later promoted to Gulf Coast manager.

JOSEPH D. HARNETT, vice-president of Standard Oil Co. (Ohio), moved from St. Louis on Sept. 2, to become assistant to **Samuel H. Elliott,** vice-president in charge of marketing, at Sohio's offices in Cleveland. Harnett became manager of the transportation department in 1954, and was elected a vice-president of the company in 1957.

D. S. BODIE, senior production superintendent of Cities Service Oil Co., is head of the company's newly consolidated South Texas production operations. The South Texas operations were formerly headed by **S. T. Duree,** who retired on Sept. 1. Headquarters for the newly consolidated district will be at Columbus, Tex., where Bodie now maintains his offices.

J. E. EMBRY has been promoted to general superintendent, and **J. D. Norris** to general drilling superintendent of the production department of Arkansas Fuel Oil Corp., in Shreveport. Embry has been assistant general superintendent of the division since 1953. Prior to his promotion, Norris was AFO's drilling superintendent at Runge, Tex.

W. H. Blackledge

P. J. Clancy

W. H. BLACKLEDGE is manager of Western Hemisphere operations, and **P. J. H. CLANCY** is manager of Eastern Hemisphere operations, for Gulf Oil Corp.'s new crude oil department, now responsible for sales, purchases, and exchanges of crude oil outside the United States. Blackledge will be headquartered in Pittsburgh, where he and Clancy have been associated with the foreign crude oil department since its organization in 1954. Clancy will establish headquarters in London in the near future.

MAX L. PASSANTE has been appointed to the newly created post of director of foreign operations for Lion Oil Co. division of Monsanto Chemical Co., El Dorado, Ark. Passante's headquarters are at Lion's production and exploration offices in Houston.

COL. KENNETH A. GASKIN, USAF (RETIRED), has been appointed to coordinate new aviation product sales activity for Atlantic Refining Co. in Philadelphia. Gaskin has been engaged in the research and development of both jet and nuclear powered aircraft, and has also been engaged in production planning for guided missiles.

JAMES NEILL FUQUAY became chief engineer for Sun Pipe Line Co.'s crude lines department at Beaumont, Tex., on Sept. 1. He succeeds **J. B. Turner,** who transferred to Venezuelan Sun Oil Co. Fuquay has been assistant chief engineer at Beaumont, since 1956. **Edgar Miller, Jr.,** and **Wallace A. Robinson** have been appointed to the newly created position of senior engineer at the Beaumont office. Miller formerly was assistant chief gauger, and Robinson was mechanical engineer at that office.

DONALD M. WEST, Mobil Oil of Canada, Ltd., is president of the new Petroleum Exploration Society of Libya, recently organized in Tripoli. Four other officers of the society are: **J. Allen Sawyer,** Esso Standard (Libya), Inc., first vice-president; **Jacque Canaple,** Compagnie des Petroles Total (Libye), second vice-president; **Daniel K. Hamilton,** American Overseas Petroleum, Ltd., secretary; and **Alex Stoupnitsky,** Compagnie Generale de Geophysique, treasurer. **Sam B. Frazier,** Gulf Oil Co. of Libya, and **Ronald C. MacLean,** D'Arcy Exploration Co. (Africa), Ltd., are directors.

GERALD F. TRIPP is president and founder of the newly formed Tripp Oil Co., Chicago. The company will specialize in heavy fuel sales to the residual trade in the Midwest.

LESTER S. AUERBACH, Gulf Oil Corp., New York, is chairman of the recently organized New York State Petroleum Council, formed by the merger of the New York Petroleum Industries Committee and the Oil Information Committee. Vice-chairman is **Ralph F. Glock,** Richfield Oil Corp., New York; and **Roy L. Brickley,** Esso Standard Oil Co., Pelham, is treasurer.

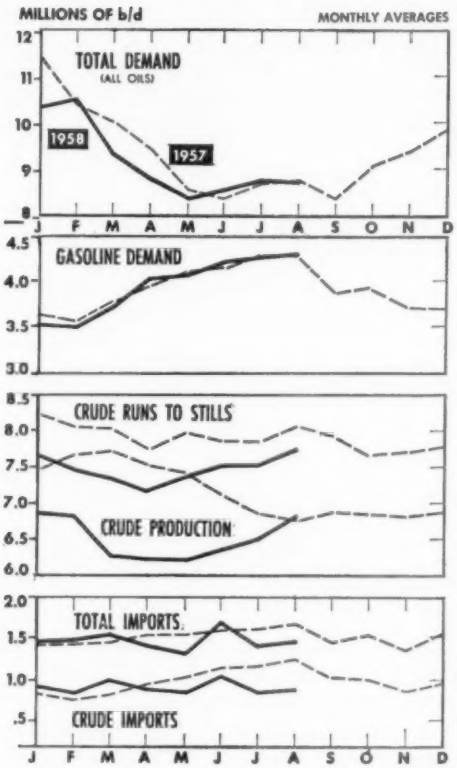
C. M. Lynch

E. J. McDermott

E. J. McDERMOTT has been promoted to manager of Sinclair Refining Co.'s marine department in New York, succeeding **Capt. H. R. Adams,** who is retiring. McDermott, formerly senior manager of operations and chartering for the department, will continue to be responsible for vessel chartering. **C. M. LYNCH,** manager of safety and training in the marine department since 1953, has taken over the position of manager of operations, and will continue to handle the functions of safety and training. **T. T. Wilkinson** has been promoted from superintendent engineer to manager of engineering, in New York. **D. D. MacDermott,** formerly manager of the marine department's Great Lakes division, Chicago, has been promoted to administrative assistant to the vice-president for inland waters and Great Lakes operations, in New York.

PETROLEUM WEEK'S

Fingertip Figures



TOTAL DEMAND

Latest week average	8.598
Year ago	8.649

GASOLINE DEMAND

Latest 4-week average	4.117
Year ago	4.109

RUNS TO STILLS

Latest week	7.604
Previous week	7.845
Year ago	7.830

CRUDE PRODUCTION

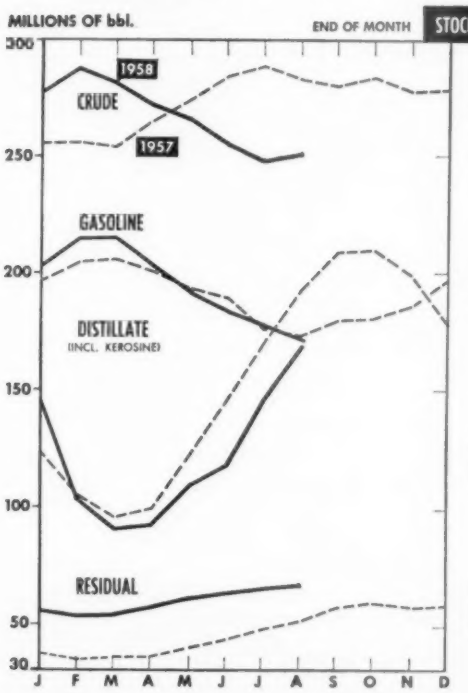
Latest week	7.087
Previous week	7.009
Year ago	6.840

TOTAL IMPORTS

Latest week	1.460
Previous week	1.227
Year ago	1.502

CRUDE IMPORTS

Latest week	.860
Previous week	.670
Year ago	.977



CRUDE STOCKS

Week-ended 9-13	240.7
Previous week	243.3
Year ago	282.1

GASOLINE

Latest week	173.2
Previous week	172.9
Year ago	173.8

DISTILLATES

Latest week	179.5
Previous week	175.7
Year ago	198.9

RESIDUAL

Latest week	68.9
Previous week	68.4
Year ago	55.2

There is little or no chance that crude inventories will rise significantly from their present low level before the end of this year.

Crude stocks, now at 240.7-million bbl., are the lowest since Apr. 21, 1958.

Crude production next month will be lower than at present.

And with most state conservation agencies apparently determined to prevent another build-up of surplus product inventories, the chances for big hikes in domestic crude output in November and December are slim.

The tight crude stock position means that refinery runs will be limited to current production. Such a limitation accounted for the sharp break in runs last week.

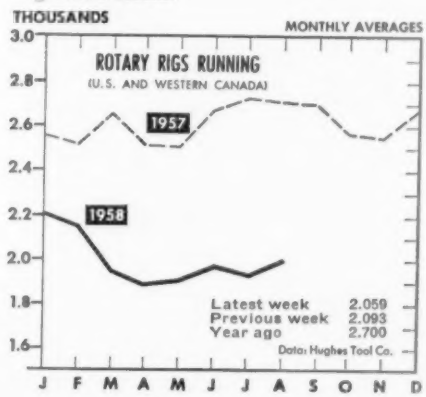
Refinery throughput for the week ended Sept. 12 declined to 7,604,000 b/d, down 241,000 b/d from the previous week, and 378,000 b/d below the peak rate for the year, which was reached the first week in September.

The Bureau of Mines estimates that refinery runs during October will not exceed 7,630,000 b/d. The available new supply for the month indicates that it may be difficult for refineries to operate at even that high a level.

A continued tight crude inventory position would be generally beneficial to the industry, since it would mean a reduction in the amount of gasoline going to storage during the "off-peak" months.

While gasoline stocks this week are just about equal to the year-ago level, they are still considered to be surplus in view of the large build-up that is normal during the fall and winter months.

The fear has been that, since distillate stocks are relatively low, refiners would tend to hike runs to make heating oils, and thus make unnecessary additions to gasoline stocks.



The Market Trend

At the Gulf: The Age of Chivalry Is Dead

It's official now: the U.S. Gulf is taking a back seat in world pricing. In fact, the role of Texas and Louisiana refiners as price leader in the cargo trade is rapidly changing to that of follower.

Last week, two Jersey Standard affiliates cut their bunker "C" fuel cargo prices 25¢ a bbl. at refining points in the Caribbean. Creole Petroleum reduced from $2.25 to $2.00 at Amuay and Caripito. Esso Export went down to the same level at Aruba.

The companies made their reductions at a time when Gulf Coast heavy fuel prices were holding fairly steady at $2.25 a bbl. This, in itself, is a sharp break with traditional pricing in the Caribbean.

Previous rifts between Gulf and Caribbean pricing mostly took place when Caribbean sellers just happened to drag their feet. When bunker "C" fuel prices in the Gulf roared up to $2.75 during the Suez crisis, Caribbean sellers were content to advance only to $2.35. When Gulf Coast kerosine prices slipped from 9.25¢ to 9¢ in the fall of last year, Caribbean sellers stood pat at the higher level.

But this time Caribbean sellers decided it was time for their area to act on its own. There were compelling reasons, too. The Gulf Coast no longer is an important export center. Moreover, f.o.b. spot bunker fuel prices in the Caribbean were seriously undercut by delivered prices on contract cargoes at principal seaboard points in North America and Europe.

Caribbean heavy oil sellers also appear willing (for the first time in years) to fight it out on a price basis with their natural enemies, coal and natural gas. This week, at New York harbor, contract cargoes started landing at $2.09 a bbl. This compares with steam coal at tidewater equivalent to about $2.27. "Dump" gas prices at New York are about $1.82-bbl. equivalent; winter volumes run about $2.19.

More Changes For No. 6:

The price-cutting by Caribbean heavy oil sellers touched off two almost simultaneous declines. East Coast prices for No. 6 in trucks and barges slipped from 20¢ to 36¢ a bbl. from Maine through the Carolinas. Across the Atlantic, ships' fuel oil prices were off generally $1.96 a ton from England to Africa.

The Upper Midwest, however, was an exception. Indiana Standard advanced its No. 6 prices 0.25¢ a gal. at Whiting, Wood River, and Casper.

How Not To Get Hurt:

Golden Eagle Refining Co. doesn't believe in putting all its eggs in one basket. Last week the company started rack operations in San Francisco.

The Los Angeles-based company said it believes in market diversification to avoid the risks of price depressions in Southern California. This relatively young firm also operates in Phoenix, Ariz.

Crude For Brazil:

Brazil has a few international companies chewing their nails this week. Last June, the country asked for 90-day options on crude offerings totaling 60,000 b/d. Last week the options expired, but no awards were made.

The guessing is that two companies—one U.S.-based, and one British-owned—will share most of the business.

The Market Place

AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of September 22

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....12.25-12.875
- Gasoline, 92 oct reg....11-11.5
- Kerosine....8.875-9.125
- Heating oil, No. 2....8.625-9
- Gas oil, 48-52 d.i....8.875-9.5
- **Fuel oil, bunker "C"....$2.00↓-2.25↓**

Caribbean, cargoes
- Avgas, Grade 100/130....16
- Gasoline, 93 oct research prem....11.25
- Gasoline, 87 oct research reg....10.375
- Gasoline, 79 oct research....9.625
- Gasoline, 70-72 oct motor method....9.5
- Kerosine....9.125
- Heating oil, No. 2....8.625
- Gas oil, 48-52 d.i....8.875
- **Fuel oil, bunker "C"....$2.00↓**

New York Harbor, barges
- Kerosine....9.95-10.2
- Heating oil, No. 2....9.45-9.7
- **Fuel oil, No. 6....$2.29↓-2.45↓**

Okla-Group 3, northern shpt., bulk
- Gasoline, 89 oct reg....12-12.75
- Kerosine....10-10.5
- Heating oil, No. 2....9
- **Fuel oil, No. 6....$1.40↑-1.45**

Chicago, bulk
- **Gasoline, 91 oct reg....12↓-12.25**
- Heating oil, No. 2....9.5-11.35
- **Fuel oil, No. 6 high sulfur....6.9↑-7↑**

Los Angeles, rack
- Gasoline, 88 oct reg....12-13.6
- Diesel fuel, PS 200....10-11.25
- Light fuel, PS 300....$3.05
- Heavy fuel, PS 400....$2.50-2.70

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....5

Pennsylvania Lubes
- Bright stock, 25 p.t....22
- 200 vis. neutral, 25 p.t....21

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v. i....23-24
- Neutral, solvent, 200-210 vis....19.5-20.5

Gulf Coast Lubes
- Bright stock, solvent, 95 v. i....24
- Neutral, solvent, 200 vis....20.5

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130....17.25
- Gasoline, 79 oct research....10.375
- Kerosine....10.375
- Gas oil, 48 d. i. minimum....10.25

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, 36.0-36.9....2.83-3.07
- North Dakota, 36.0-36.9....3.07
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00-3.07
  - West Texas, N. M., inter., 36.0-36.9....3.00
  - West Texas, N. M., sour, 32.0-32.9....2.86
  - East Texas, flat....3.25
  - Mirando, 28.0-28.9....3.31
- Illinois Basin, flat....3.00
- Pennsylvania Grade, Bradford dist., flat....3.90
- California, Signal Hill, 21.0-21.9....2.63-2.73†
- North Louisiana-Arkansas, 36.0-36.9....2.82-3.02
- Wyoming, sweet, 36.0-36.9....2.90-3.00
- Wyoming, sour, 32.0-32.9....2.71

Canada (flat prices, at the well)
- Acheson-Stony Plain (Alta.)....2.61
- Leduc-Woodbend (Alta.)....2.67
- Redwater (Alta.)....2.56
- Daly (Man.)....2.39
- Smiley (Sask.)....2.33

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 48.0-48.9, Tucupido....3.75
- San Joaquin, 41.0-41.9, Puerto la Cruz....3.34
- Oficina, 35.0-35.9, Puerto la Cruz....3.05
- Tia Juana, Medium, 26.0-26.9, Amuay....2.55
- **Bachaquero, flat, Las Piedras....1.93↓-2.08**
- Tarra, 38.0-38.9, San Lorenzo....3.08
- Lagunillas Heavy, flat, Cardon....2.25

†Differential per deg. of grav. varies.

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura....2.08
- Safaniya, 27.0-27.9, Ras Tanura....1.65
- Iran, 34.0-34.9, Bandar Mashur....2.04
- Iran, 34.0-34.9, Abadan....1.99
- Iraq, 35.0-35.9, Fao....1.98
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.85
- Qatar, 41.0-41.9, Umm Said....2.23
- Neutral Zone, Burghan, 23.5-24.4, Mina Saud....1.61
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud....1.43

Middle East, Eastern Mediterranean
- Arabian, 36.0-36.9, Sidon....2.49
- Iraqi, 36.0-36.9, Tripoli, Banias....2.49

Far East, Cargoes, FOB Lutong, Sarawak
- Seria Light, 37-38....2.75

KEY TANKER RATES

(Last paid, per long ton, single voyage)

- **U.S. Gulf-New York, clean....(USMC flat) $2.85↓**
- U.S. Gulf-New York, dirty....(USMC —10%) $2.57
- **NWI-USNH, dirty....(USMC —45%) $1.51↓**
- NWI-UK/Cont., dirty....(Scale —50%) 16/3*
- Persian Gulf-UK/Cont., dirty....(Scale —55%) 27/9*
- Persian Gulf-USNH, dirty....(USMC —60%) $5.08

**Sterling.*

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DEPT/Service & Equipment Companies

GARRETT E. KAUFFMAN, formerly general accountant, has been appointed assistant controller of National Supply Co., Pittsburgh. He succeeds **Gordon R. Graham,** who was recently promoted to controller. **E. B. Malloy** has been named manager of general accounting. He started with National Supply in 1954 as general auditor.

G. E. Kauffman

T. P. Toudouze

THOMAS P. TOUDOUZE has joined the Houston sales staff of Tex-Tube, Inc., producer and supplier of oil country tubular goods. He was formerly a mud engineer in Texas, California, and Utah for the Baroid division of National Lead Co.

EVER-TITE COUPLING CO., New York, has appointed Shields-Harper & Co., Oakland, Calif., Pacific Coast distributor of its couplings, nozzles, adapters, and other products. Shields-Harper maintains branch offices in Los Angeles, Portland, and Seattle.

C. HORACE SANDERS was named southwest district manager for Cooper-Bessemer Corp., with offices in Dallas. He replaces **A. A. Burell,** who has retired after 33 years with the company. Sanders has been with the company since 1927, serving in Shreveport and, more recently, in Dallas.

TONY VOLOTKO, formerly a field sales representative in Houston for Mission Mfg. Co., has been named service engineer at Mission's office in that city. **Harold Herrin** has become a field sales representative in New Iberia, La. He was formerly a service engineer at Houma, La.

EUSTACE LINGLE has been named vice-president in charge of industrial sales and education for Oakite Products, Inc., New York. Lingle was elected a director of the company in 1939, and became a vice-president in 1953.

J. E. KEFFER has become credit manager for Continental-Emsco Co.'s Oklahoma - Kansas - North Texas division, with headquarters at Tulsa. He was formerly a special representative for Continental-Emsco in Calgary. **A. B. LaPrade** has become division credit manager of the South Louisiana and South Texas divisions, with headquarters in Houston. **H. P. Dawkins,** formerly division credit manager in Houston, has transferred to the company's general office at Dallas as an assistant credit manager. All credit managers operate under the supervision of **C. L. Vickers,** Continental-Emsco's treasurer and chief credit manager.

WALT S. SEPURA has been elected vice-president and plant manager of John Wood Co.'s Bennett Pump division, Muskegon, Mich. He has been factory manager of Bennett Pump plants at Muskegon and Hart, Mich., since 1952. He will be in charge of the division's manufacturing, purchasing, and personnel departments. Sepura will report to **A. F. Jordan,** senior vice-president and general manager of the division.

JAMES E. (JIM) CAMPBELL has opened offices in Denver to represent companies selling to the oil industry in the Rocky Mountain area. He was formerly vice-president and general manager of Chemical & Geological Laboratories, and will now be that company's representative in Denver.

HENRY C. FROST, assistant chief engineer of Corn Products Refining Co., Chicago, became president of the Instrument Society of America at its 1958-1959 meeting in Philadelphia, on Sept. 17. Frost was elected president-elect and secretary at the Society's 1957-1958 meeting at Cleveland. Other new officers of the Society include: **John Johnston, Jr.,** in the engineering service division of E. I. du Pont de Nemours & Co., president-elect and secretary; **Glen G. Gallagher,** instrument engineer for Fluor Corp., Ltd., Los Angeles, vice-president of the standards and practices department; **Thomas C. Wherry,** assistant branch manager of the instrument and equipment laboratory of Phillips Petroleum Co., vice-president of the technical department; and **Howard W. Hudson,** vice-president of manufacturing for Panellit, Inc., treasurer.

J. Schuelke

C. F. Riker

CHARLES F. RIKER is general manager of the new Marketing Division of Johnston Testers, Inc., and **JACK SCHUELKE** is sales manager for that division. Both men will have offices in Houston. The new division will be responsible for sales and service of the company's oil-well sonic pump. Riker was formerly a sales engineer for the company, and Schuelke was technical editor for World Oil Magazine, Houston. **W. E. (Bill) Hill** is district sales engineer, with headquarters in Houston, and **Jim Hamilton** is the division's sonic pump installation engineer.

CLASSIFIED

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The advertising rate is $16.75 per inch for Equipment and Business Opportunity advertising appearing on other than a contract basis. Contract rates quoted on request.

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OPPORTUNITY FOR REFINERY SUPERVISOR

PLANT PROTECTION & SAFETY

Experienced Refinery Safety Engineer with ability and capacity to supervise Plant Security and inaugurate Safety Program. Position at newly constructed independent oil company refinery at Sewaren, N. J. Send resume indicating experience, education, and salary requirement to Personnel Manager.

HESS TRADING & TRANSPORT, INC.
P.O. BOX 631
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OPENING FOR PROCESS SUPERINTENDENT

New Refinery at Sewaren, N. J. has opening for a Process Superintendent. Excellent opportunity for experienced individual who has ambition and ability. Applicant should have ten years refinery operating experience. Chemical engineering education preferred. All replies handled in confidence. Salary commensurate with ability and experience. Forward resume describing work history, education, and salary desired to:

MR. LEON HESS
HESS TRADING & TRANSPORT, INC.
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Just published—a 57-page book giving financial comparisons of 85 U.S. oil companies. See how your company compares with competitors. Gives capitalization, production, cash flow, earnings, dividends. Also included: World Oil Map in color, complete data on Middle East holdings. Prepared by the publishers of **Oil Statistics Bulletin** and **Canadian Oil Reports**—originally for outside investors and now being made available to oil-company personnel. Only $3.85.

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OPPORTUNITY FOR REFINERY MANAGER

Unusual opportunity at our new Sewaren, New Jersey refinery for a seasoned Refining Executive who has had at least ten years operating and administrative experience. Must have initiative, drive, and capacity to direct all phases of complete 45,000 b/d refinery operation. Petroleum or chemical engineering background preferred. All information confidential. Salary commensurate with ability and experience. Forward resume describing education, operating experience, and salary requirement to:

MR. LEON HESS
HESS TRADING & TRANSPORT, INC.
P.O. BOX 631, PERTH AMBOY, N. J.

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Mail: Apartado 3963 **Phone: 54 48 02**

OPENING FOR REFINERY SHIFT FOREMAN

Newly constructed Oil Refinery at Sewaren, N. J. has opening for several Shift Foremen. Applicants must be experienced in supervising hourly employees working on refinery units and have general knowledge of Processing Operations and Refinery Equipment. All information confidential. Salary commensurate with ability and experience. Forward resume to Personnel Manager indicating work experience, education, and salary requirement.

HESS TRADING & TRANSPORT, INC.
P.O. BOX 631
PERTH AMBOY, N. J.

OPENING FOR LEAD BLENDER—REFINERY

Independent oil company refinery at Sewaren, N. J. has opening for a Gasoline Blender. Must be experienced in refinery blending of gasoline, including tetra-ethyl lead, and additive blending. Send resume to Personnel Manager.

HESS TRADING & TRANSPORT, INC.
P.O. BOX 631
PERTH AMBOY, N. J.

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POSITIONS WANTED

Records Files Administrative Asst., young woman, 34, geology major, 6 years experience records files library management, latest with nationally known mgt. consulting firm. Desires position in petroleum industry, single, willing to travel or relocate. PW-8885, Petroleum Week.

Attorney-Engineer—Ten years refining engineering experience. Desires position in industrial management or in patent law. PW—8932, Petroleum Week.

OPPORTUNITY FOR REFINERY ACCOUNTANT

Opening for Refinery Accountant. We have an excellent opportunity for Senior Accountant to be in charge of all refinery accounting. This is an opportunity for experienced accountant who has initiative, ambition, and ability. Applicant should have refinery or similar accounting experience. All replies kept in confidence. Salary commensurate with ability and experience. Forward resume describing work history, education, and salary requirement to:

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OPENINGS FOR REFINERY-INSTRUMENT MECHANICS

Newly constructed independent oil company refinery at Sewaren, N. J. has openings for Instrument Mechanics. Applicants must be experienced and capable of servicing and maintaining pneumatic, mechanical, electrical and electronic equipment. Send resume to Personnel Manager.

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Import plan objections may mean . . .

Road to Mandatory Control

THE OUTBURST OF ATTACKS on the proposed plan to control imports voluntarily threatens to lead the oil industry to one of two possible ends. Either of the two would be disastrous.

Without some form of moderate control, the potential flood of cheap foreign oil means that the oil industry is headed toward either mandatory federal regulation or a "dog-eat-dog" existence. In the latter case, competitive conditions would lead to the early demise of a large part of the industry, leaving absolute control of petroleum supplies to U.S. consumers in the hands of a very few powerful companies.

PETROLEUM WEEK does not believe any thinking oil man wants to see the industry headed for either of such extreme positions.

IMPORT CONTROLS ARE JUSTIFIED for one reason only. That is to insure adequate domestic reserves for national security. In lieu of voluntary controls to offer such guarantee—or protection—for domestic petroleum, the only alternatives are high tariffs or mandatory federal controls.

The chances of establishing sufficiently high tariffs to offer the needed protection are remote. Political consequences at home and abroad would be too great for any administration to risk.

The "solution" then narrows to mandatory federal controls over imports. But there is little likelihood that, once the foot of federal regulation got into the door, it would stop at just regulating imported oil. It would sooner or later, by desire—and, quite likely, by necessity—regulate all petroleum supply.

Strange as it may seem to some, there is already talk within the oil industry of the possible need to "control" U.S. refiners through the nationwide, uniform regulation of petroleum raw materials used by processors. The theory behind this viewpoint is that voluntary, or even mandatory, control of imported supply won't be sufficient to prevent one of the most serious economic ills of the oil industry—the perennial oversupply of products. The repercussions of that chronic disease are reflected throughout the industry, it is argued, and therefore must be corrected at the root.

The cause of the oversupply, the proponents of full federal regulation say, is the availability of excess refining capacity in competitive hands. Since the surplus capacity was created at the request of the government, the thought of that group is that the government should step in and regulate the use of all U.S. refining capacity. It boils down to nationwide proration of petroleum supply.

NO IMPORT PLAN will suit everyone. The proposed plan permits nothing new: Processing deals and sales of imported oil at lucrative prices by some were made under the present plan. But the industry must live with some form of voluntary control, or individual greed will eventually lead it down the path to federal regulation.

Congrats and $25 to John R. Ewing, P. O. Box 174, Broussard, La.

Automation and quality control are two of the most important factors in modern manufacturing . . and especially in the making of Lone Star API casing, tubing and line pipe. Lone Star electric-weld pipe is made in America's most ultra modern steel plant . . where every length is given multiple exacting tests in our rigid quality control program. Result: strong, tough pipe for dependable service.

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Lone Star STEEL COMPANY

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What This Dowell Research Group Means To You

This Dowell Research Group includes four PhD's and four chemical engineers. They are huddling on a particularly knotty production problem for one of Dowell's customers.

At Dowell's Tulsa Research Center there are ten such teams. Their job is to pool their skills and knowledge to help you produce oil and gas more efficiently.

This Tulsa research group is only part of the Dowell Research Story, however. Many of your problems are solved in the field by skilled petroleum engineers and field laboratory personnel. Still a third level of basic research is available to the Dowell customer when necessary—the vast laboratory facilities of The Dow Chemical Company.

Think your problem is unique? Or tough?

Call for a huddle with a Dowell research group. Because their work covers such a wide area, chances are they already have some data that will prove helpful in solving your problem. If they don't, you can be sure you'll get their undivided attention and a wealth of experience.

Dowell, Tulsa, Oklahoma.

Services for the oil industry DOWELL

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